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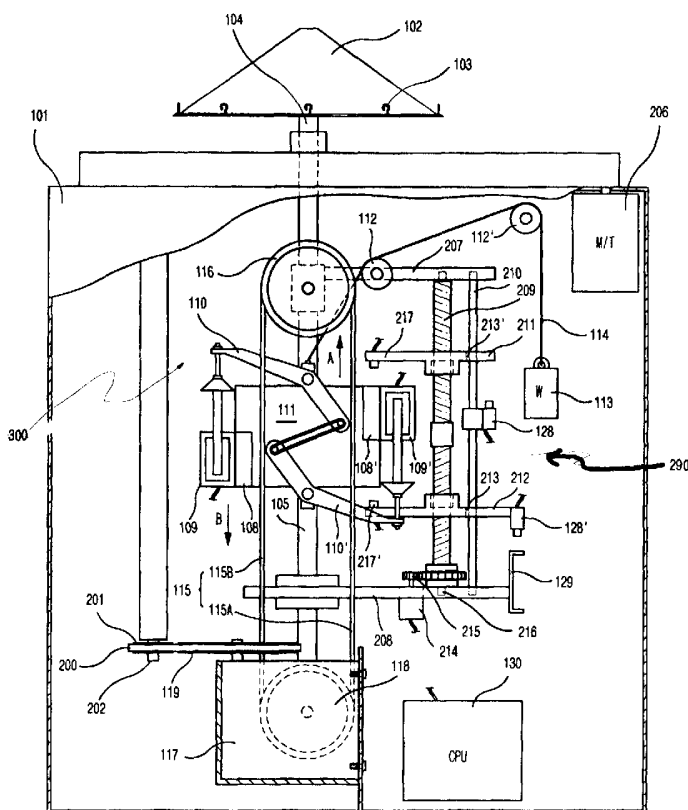
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- (71) Applicant and
(72) Inventor: **SHIN, Kwan-Sik** [KR/KR]; #240-13, Guui-dong, Gwangjin-gu, Seoul 143-200 (KR).
- (74) Agent: **KIM Yoo**; 201, Tae Woo Bldg, 746-15, Yeoksam-dong, Kangnam-gu, Seoul 135-080 (KR).
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(54) Title: A YARN PULL-OUT MACHINE



(57) Abstract: A yarn-cleaving machine is disclosed, in which the revolutions of a driving motor are not shifted to forward/reverse directions, the yarn bobbin is firmly secured, the tension of the raw yarn is properly adjusted, and many strands of the yarn are uniformly distributed so as to automatically wind the many strands of the yarn to a plurality of the yarn bobbins by measuring their lengths. The inner circumference of the raw yarn bobbin is pressed with a plurality of annular elastic members, and therefore, either at low speed revolutions or high speed revolutions, the raw yarn bobbin can be prevented from idle revolutions. Further, the lifting part moves up and down without any acceleration and deceleration, and therefore, the cleaved yarns are uniformly wound on the cleaved yarn bobbins. Further, the total length of the cleaved yarns to be wound is calculated in advance to set up a reference value, and the actual wound amount becomes only as much as the reference value.



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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

A YARN PULL-OUT MACHINE**FIELD OF THE INVENTION**

The present invention relates to a yarn-cleaving
5 machine. Particularly, the present invention relates to
a yarn-cleaving machine in which the revolutions of a
driving motor are not shifted to forward/reverse
directions, the raw yarn bobbin is firmly secured, the
tension of the raw yarn is properly adjusted, and many
10 strands of the yarn are uniformly distributed so as to
automatically wind the many strands of the yarn to a
plurality of cleaved yarn bobbins by measuring their
lengths.

BACKGROUND OF THE INVENTION

The generally known yarn-cleaving machine operates
in such a manner that it divides the raw yarn of a raw yarn
bobbin of a yarn holding machine into a plurality of
strands of yarn to wind them to a plurality of cleaved yarn
20 bobbins.

This yarn-cleaving machine will be described in more

detail below.

As shown in FIG. 1, the general yarn-cleaving machine includes: a frame 1; a yarn drum frame 2 installed on a side of the frame 1; and a rectangular frame steel plate 3 installed above the yarn drum frame 2.

A cleaved yarn guide cap 4 is installed above and outside the frame 1, and a plurality of cleaved yarn bobbin shaft pins are vertically installed upon the top of the frame 1 and around the cleaved yarn guide cap 4.

The cleaved yarn guide cap 4 is installed coaxially with a lifting device (not illustrated) which is installed within the frame 1. The plurality of the cleaved yarn bobbin revolution pins 5 are connected through a belt (not illustrated) to a pulley (not illustrated) which is installed to a revolution shaft of a driving motor (not illustrated) which is in turn installed within the frame 1.

A yarn drum 7 is installed on a raw yarn drum revolution pin 6 in the lower portion of the raw yarn drum frame 2, while a tension device 8 is installed above the raw yarn drum 7.

A plurality of guide rollers 9 are installed on the rectangular frame steel plate 3.

The conventional yarn-cleaving machine constituted as above will be described as to its operations.

5 First a raw yarn bobbin 10 is installed coaxially to the yarn drum 7, and the free end of the raw yarn 11 which is wound on the raw yarn bobbin 10 is cleaved into a plurality of strands. The plurality of the yarn strands 11' are engagingly passed through the tension device 8,
10 the rectangular frame steel plate 3 and the cleaved yarn guide cap 4, (that is, their guide rollers 9 and 9'). The plurality of the yarn strands are respectively hooked to a plurality of guide hooks 12, and then, each of the yarn strands is manually secured to each of cleaved yarn bobbins
15 13.

Thereafter, if the plurality of the cleaved yarn bobbin revolution pins 5 are rotated by the driving motor, then the raw yarn bobbin 10 revolves together with the cleaved yarn bobbin revolution pins 5, the former and the
20 latter supporting the raw yarn 11 and the cleaved yarn 11' respectively. At the same time, the raw yarn drum 7 and

the raw yarn drum revolution pin 6 revolve, and thus, the raw yarn 11 is cleaved into a plurality of cleaved yarn strands to be wound around the cleaved yarn bobbins 13 respectively.

5 Under this condition, the length of the raw yarn which extends from the raw yarn bobbin 10 toward the cleaved yarn bobbins 13 is arbitrarily judged by the operating person by looking at the wound amounts of the cleaved yarn bobbins and the residual amount of the raw yarn of the raw yarn
10 bobbin 10. Further, the motor is provided with a clutch for enabling shifts of revolutions to forward/reverse. Accordingly, the motor is vulnerable to the humidity, and if foreign materials such as oil, water and dust intrude, then a slip occurs, with the result that the cleaved yarn
15 strands are non-uniformly wound on the bobbins during the accelerations and decelerations upon shifting to forward or reverse.

Further, when the raw yarn is unwound, a proper tension has to be given so as for the cleaved yarn strands
20 to be firmly wound on the bobbins with a proper hardness, and this can be achieved only if the raw yarn drum revolves

at the same revolution speed as that of the raw yarn drum revolution pin.

However, conventionally the total length of the cleaved yarn wound on the bobbins or the unwound and
5 carried length of the raw yarn is arbitrarily judged by the operating person. On that standard, the operating person stopped the machine, and therefore, the total wound amount of the cleaved yarn is not uniform, with the result that the products are not reliable.

10 Further, since the motor is provided with a clutch, the motor is vulnerable to the humidity, and if foreign materials such as oil, water and dust intrude, then a slip occurs, with the result that the cleaved yarn strands are non-uniformly wound on the bobbins during the
15 accelerations and decelerations upon shifting to forward or reverse. Further, the conventional tension device is not capable of automatically adjusting the tension of the raw yarn, and therefore, when cleaving the raw yarn, the raw yarn is subjected to a fatigue, with the result that
20 the cleaved yarns are loosely wound on the bobbins. Further, there is no securing device for the raw yarn

bobbin, and therefore, the raw yarn bobbin idly revolves.
As a result, the cleaved yarns are loosely wound on the
cleaved yarn bobbins, and therefore, the final product
cannot be used in the fabric machine.

5 **SUMMARY OF THE INVENTION**

The present invention is intended to overcome the
above described disadvantages of the conventional
technique.

Therefore, it is an object of the present invention
10 to provide a yarn-cleaving machine in which a lifting part
ascends and descends without acceleration or deceleration
so as to make the yarn wound uniformly on cleaved yarn
bobbins, the length of the yarn to be wound from the raw
yarn bobbin to the cleaved yarn bobbins is pre-determined
5 to be compared with the current information, and an
automatic control is carried out so as to make the
predetermined value and the current carriage value equal
to each other.

It is another object of the present invention to
0 provide a yarn-cleaving machine in which the tension of
the raw yarn can be accurately adjusted during its

unwinding, the tension of the raw yarn is maintained at the reference value (predetermined value) so as to prevent any fatigue in the raw yarn, and the inside circumference of raw yarn bobbin of the raw yarn drum is
5 pressed with an annular elastic member so as to prevent any idle revolutions of the raw yarn bobbin during the low and high revolution speeds, thereby improving the productivity and the reliability of the products.

In achieving the above objects, the yarn-cleaving
10 machine according to the present invention includes: a base body with frames and power devices installed therein; a yarn cleaving part formed above the base body and including a cleaved yarn guide cap and a plurality of cleaved yarn bobbin revolution pins; a driving part
15 installed within the base body, for lifting or rotating the yarn-cleaving part; a raw yarn drum-securing part installed below a raw yarn drum frame, for securing the raw yarn drum; a raw yarn tension-adjusting device installed above the raw yarn drum frame, for adjusting
20 a tension of the raw yarn; and

a guide part consisting of a plurality of guide

rollers and formed above the tension-adjusting device,
characterized in that:

the driving part has a lifting bar, the lifting bar
being installed within the base body through a vertical
5 guide cylinder of a central top of the base body, an upper
end of the lifting bar being attached to a bottom center
of a round conical cap, the round conical cap including
a plurality of guide hooks at certain constant intervals;
and a vertical guide bar is secured in front of and
10 separatedly from the lifting bar, with both ends of the
guide bar being secured to upper and lower inside portions
of the base body;

the lifting bar is fastened with a bolt into a
fastening hole; a guide bar is inserted into a guide hole;
15 a pair of solenoids are installed in opposite directions
to outsides of respective supporting parts, the
supporting parts protruding to left and right sides; a
lifting part is connected through a string to a balance
weight; two picking bars are hinge-coupled to a lifting
20 bracket, one end of the picking bar being
contacted/separated to and from an inside of the

supporting part, and another end of the picking bar being hinge-coupled to an actuation bar of the solenoid;

a lifting pulley is installed in an upper portion of the base body so as to make a lifting belt disposed
5 into between the supporting parts of the lifting bracket and one ends of the picking bars; a decelerator is installed in a lower portion of the base body so as to make an output pulley directly disposed below the lifting pulley; a lifting power part is connected to a driving
10 motor, and includes an input pulley of the decelerator, a first tension belt, upper and lower pulleys of a passive revolution shaft, a second tension belt, an intermediate pulley, a third tension belt, and the driving motor; and
15 an adjusting bar and a guide bar are vertically and separately installed between upper and lower plates, one end of each of the plates being secured to the guide bar, and another end of each of the plates protruding to one side;

the adjusting bar is rotatably installed; both ends
20 of the guide bar are rotatably secured; upper and lower movable beams are rotatably and mutually separately

installed on the adjusting bar; one end of each of the movable beams project to receive the lifting bracket into between the two ends of the movable beams; another end of each of the movable beams receives a lift adjusting part, the lift adjusting part having a guide slot; a step motor of a lower portion of the adjusting bar is meshed to first and second pinion gears; and a contact terminal is installed on one end of each of the movable beams, the lifting bracket being disposed between the two movable beams; and

a sensing part includes: a limit switch installed on the guide bar contactedly to another end of each of the movable beams; and a gap adjusting bar installed to a lower plate contactedly to its terminal part; and a control part causing the step motor to be rotated by certain angular degrees in response to sensed signals of the contact terminal, and supplies or withholds a power to and from the solenoid, and supplies or withholds the power to and from the driving motor in response to sensed signals of the limit switch.

Meanwhile, the guide roller of the guide part

includes:

a measuring part consisting of: a yarn carriage
guide rolling device with a plurality of through holes and
rim parts formed between a hub and an outer circumference,
5 and with its shaft installed by using a round bearing to
a shaft pin, with one end of the pin being secured to a
rectangular pipe frame; and a revolution speed sensor with
its leading end nearing to a rear face of the rolling device,
and with its rear end being secured to the frame so as to
10 make the rear end disposed on an axis of the through hole;

a display part consisting of: a digital display A
for displaying a revolution value of the rolling device
as sensed by the revolution sensor in numerals; and a
digital display B for arbitrarily inputting a revolution
15 value of the rolling device; and

a second control part (CPU) for receiving an
information from the revolution sensor to display the
information to the digital display A in numerals, for
decreasing the revolution value on finding a closeness
20 between a pre-set information and a current sensed
information after comparison of the pre-set information

of the digital display B with the currently sensed information, and for stopping the driving motor on finding a correspondence between the pre-set information and the currently sensed information by controlling a power
5 variable switch.

The tension-adjusting device includes: a securing part installed on a raw yarn drum frame of a side of the yarn cleaving machine to be rotated interlockingly to the cleaved yarn bobbins, and secured to a fixed bearing by
10 means of a bolt, and having a securing rod with a securing slot formed on a securing edge, and having a rotatable wheel pin on another side, the wheel pin being rotated by a connection piece, and the connection piece being secured to the securing part;

15 a tension adjustment part, with its one end being installed in the securing slot of the securing rod of the securing part, with its another end being installed on an actuation piece of the wheel pin, with a pair of brake shoes being installed on a connection spring of the securing rod,
20 with a lining being formed on each of the brake shoes to surround its outside, and with a brake drum being secured

to a rear end of the raw yarn drum revolution pin so as to be interlockingly revolved together with the raw yarn drum revolution pin;

a tension transmission part, with a tension
5 transmitting rod being connected to the connection pin of the securing part to decelerate the tension adjustment part, with an upper end of the tension transmitting rod being connected to a tension rod, the tension rod moving up and down in accordance with the tension of the raw yarn,
10 so as to transmit the tension of the raw yarn; and

a tension setting part, with one end of a tension adjustment spring being connected to another end of the tension transmission part, another end of the tension adjustment spring being connected to an actuation device,
15 the actuation device having a guide hole on one side and a spiral slot in its inside, with an adjustment handle being formed to cause the actuation device to move up and down, with an actuation rod having a spiral lines on its outside, and with a guide rod being inserted into the guide
20 hole to make the actuation device move up and down without being rotated.

The raw yarn drum securing part includes: the raw yarn drum revolution pin, with a nut hole being formed on its leading end in an axial direction, and with a fastening key projecting from its outside; a raw yarn drum axially
5 installed to the raw yarn drum revolution pin, and including a left drum and an intermediate drum, and including a right drum, the two drums (left and right drums) having annular recesses respectively, and the right drum having a key slot in the axial direction;

10 a plurality of bolt bars for fastening the left and right drums to the intermediate drum; an adjustment bolt for being fastened into the nut hole to perform reciprocation movements during forward/reverse revolutions over a certain distance; a tension spring
15 installed between the bottom of the head of the adjustment bolt and the left drum to press the left drum in the axial direction; and annular elastic members axially installed respectively within annular recesses of the left and right drums so as to be expanded in the radial direction upon
20 a close contact of the drum.

BRIEF DESCRIPTION OF THE DRAWINGS

The above objects and other advantages of the present invention will become more apparent by describing in detail the preferred embodiment of the present invention
5 with reference to the attached drawings in which:

FIG. 1 illustrates the conventional yarn-cleaving machine;

FIG. 2 is a frontal sectional view of the driving part of the yarn-cleaving machine according to the
10 present invention;

FIG. 3 is a side view showing the assembled state of the lifting bracket and the lifting bar of the driving part of the yarn-cleaving machine according to the present invention;

15 FIG. 4 is a plan view of the power transmitting means of the driving part of the yarn-cleaving machine according to the present invention;

FIG. 5 illustrates the ascended status of the lifting bar and the cleaving cap of the yarn-cleaving machine
20 according to the present invention;

FIG. 6 illustrates the descended status of the

lifting bar and the cleaving cap of the yarn-cleaving machine according to the present invention;

FIG. 7 illustrates the guide part for measuring the yarn carriage length in the yarn-cleaving machine
5 according to the present invention;

FIG. 8 is a sectional view of the yarn carriage length measurement part of the yarn-cleaving machine according to the present invention;

FIG. 9 is a conceptive view showing the actuation
10 sequence of the respective parts for measuring the yarn carriage length in the yarn-cleaving machine according to the present invention;

FIG. 10 is a perspective view of the raw yarn tension-adjusting device of the yarn-cleaving machine according
15 to the present invention;

FIG. 11 is a frontal view of the raw yarn tension-adjusting device of the yarn-cleaving machine according to the present invention;

FIG. 12 is an exploded perspective view of the
20 tension adjusting part of the raw yarn tension-adjusting device of the yarn-cleaving machine according to the

present invention;

FIG. 13 is a sectional view showing the state of the using of the raw yarn tension-adjusting device of the yarn-cleaving machine according to the present
5 invention;

FIG. 14 is another sectional view showing the state of the using of the raw yarn tension-adjusting device of the yarn-cleaving machine according to the present invention;

10 FIG. 15 illustrates a using state of the raw yarn tension- adjusting device of the yarn-cleaving machine according to the present invention, with a plurality of the tension-adjusting devices formed therein;

FIG. 16 is a schematic view showing the installation
15 status of the raw yarn drum securing part of the raw yarn tension- adjusting device of the yarn-cleaving machine according to the present invention;

FIG. 17 is an exploded view of the raw yarn drum securing part of the yarn-cleaving machine according to
20 the present invention;

FIG. 18 is a sectional view of the yarn-cleaving

machine according to the present invention, the raw yarn bobbin being fitted to the raw yarn drum securing part; and

FIG. 19 is a sectional view of the yarn-cleaving machine according to the present invention, the raw yarn bobbin being secured to the raw yarn drum securing part.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Now the present invention will be described in detail referring to the attached drawings.

FIG. 2 is a frontal sectional view of the driving part of the yarn-cleaving machine according to the present invention. FIG. 3 is a side view showing the assembled state of the lifting bracket and the lifting bar of the driving part of the yarn-cleaving machine according to the present invention. FIG. 4 is a plan view of the power-transmitting means of the driving part of the yarn-cleaving machine according to the present invention.

As shown in these drawings, the yarn-cleaving machine according to the present invention includes: a

lifting part for distributing a plurality of strands of
cleaved yarns, and for performing ascending/ descending
motions; a power part for vertically driving the lifting
part up and down; a lift adjustment part for adjusting
5 the vertical ascending/descending length; and an
automatic lift control part for automatically
controlling the actuations of the lifting mechanism part
and the lift adjustment part.

As shown in FIGs. 2, 3 and 4, the driving part has
10 a lifting bar 104, and the lifting bar 104 is installed
within the base body through a vertical guide cylinder
of a central top of the base body. The upper end of the
lifting bar 104 is attached to a bottom center of a round
conical cap 102, and the round conical cap 102 includes
15 a plurality of guide hooks 103 at certain constant
intervals. A vertical guide bar 105 is secured in front
of and separatedly from the lifting bar 104, with both
ends of the guide bar 105 being secured to upper and lower
inside portions of the base body 101. The lifting bar
20 104 is fastened into a fastening hole 106 with a bolt.

The guide bar 105 is inserted into a guide hole 107,

and a pair of solenoids 109 and 109' are installed in opposite directions to outsides of respective supporting parts 108 and 108'. The supporting parts 108 and 108' protrude to left and right sides of a front portion of the guide bar 105, and a lifting bracket 111 is connected
5 through a string (guided by rollers 112 and 112') to a balance weight 113. One end of each of picking bars 110 and 110' is hinge-coupled to the lifting bracket 111, and another end of each of the picking bars 110 and 110' is
10 hinge-coupled to an actuation bar of each of the solenoids 109 and 109'.

A lifting power part is constituted as follows. That is, a lifting pulley 116 is installed in an upper portion of the base body 101 so as to make a lifting belt
15 115 disposed into between the supporting parts 108 and 108' of the lifting bracket 111 and one end of the picking bars 110 and 110'. A decelerator 117 is installed in a lower portion of the base body 101 so as to make an output pulley 118 disposed directly below the lifting pulley 116.
20 An input pulley 119 of the decelerator 117 is connected to a driving motor 206 through a generally known means.

The lift adjustment part is constituted as follows.

That is, an adjusting bar 209 and a guide bar 210 are vertically and separately installed between upper and lower plates 207 and 208, one end of each of the plates 207 and 208 being secured to the guide bar 210, and another end of each of the plates 207 and 208 protruding to one side. The adjusting bar 209 is rotatably installed, while both ends of the guide bar 210 are fixed. Upper and lower movable beams 211 and 212 are rotatably and mutually separately installed on the adjusting bar 209.

The automatic lift control part is constituted such that a step motor 214 disposed at an end of the adjusting bar 209 is meshed through first and second pinion gears 215 and 216. A sensing part 200 is formed at a side of the lifting bracket 111, and the sensing part 200 is constituted such that: contact terminals 217 and 217' are formed on the upper and lower movable beams 211 and 212; a limit switch 218 is installed on the guide bar 210 to be contacted to another end of the upper movable beam 211; a gap-adjusting bar 129 is formed on the outer end of the lower plate 208; and elements such as the step motor

214, the contact terminals 217 and 217', the limit switches 218 and 218' and the solenoids 109 and 109' are connected to a control part 220 so as to be controlled by it.

5 The usual transmission means from the input pulley 119 of the decelerator 117 to the driving motor 206 in the lifting power part includes: a first tension belt 119, lower and upper pulleys 201 and 203 of a passive revolution shaft 202, a second tension belt 204, an
10 intermediate pulley 205, a third tension belt 204' and a leading end pulleys 205' of a driving motor 206.

 The adjusting bar 209 of the lift adjusting part has two sets of threaded parts, the two sets of the threaded parts being formed in the opposite directions from each
15 other. If the step motor 214 is driven to rotate the adjusting bar 209 in the forward direction, then the upper and lower movable beams 211 and 212 move toward the middle portion of the adjusting bar 209 to approach to each other.
On the other hand, if the adjusting bar 209 is rotated
20 in the reverse direction, the upper and lower movable beams 211 and 212 run away from each other.

The rated voltage of the step motor 214 of the automatic lift control part is dc 12V.

Now the present invention constituted as above will be described as to its operations.

5 If the driving motor 206 is activated, then its revolution torque is transmitted through the usual transmission means such as the first tension belt 119, the lower and upper pulleys 201 and 203 of the passive revolution shaft 202, the second tension belt 204, the
10 intermediate pulley 205, the third tension belt 204', and the leading end pulley 205' of the driving motor 206 to the input pulley 119 of the decelerator 117.

The revolution power of the driving motor 206 thus transmitted is converted to the optimum revolution speed
15 by the decelerator 117 so as to be outputted to the output pulley 118. Therefore, the left and right portions of the lifting belt 115 between the output pulley 118 and the lifting pulley 116 are running upward and downward in the directions of the arrow marks A and B.

20 Thus, when the lifting belt 115 continuously runs, if the power is supplied to the solenoid 109, and thus

if its actuation bar is inserted into the body of the solenoid 109, then the leading end of the picking bar 110 approaches to the inside of the supporting part 108'. At the same time, a part of the lifting belt 115 is engaged, 5 and therefore, the lifting bracket 111 rises vertically in the direction of the arrow mark B together with the guide bar 105 along the lifting belt 115.

At the same time, the lifting bar 104 and the cleaving cap 102 vertically rise, while the cleaving cap 102 is 10 uniformly winding the yarns to the cleaved yarn bobbins 13, as shown in FIG. 5.

If the upper portion of the lifting bracket 111 thus rising contacts to the contact terminal 217 of the movable beam 211, then the power to the solenoid 109 is 15 disconnected, while the power is supplied to the solenoid 109'. Therefore the actuation bar of the solenoid 109' is inserted into the body of the solenoid 109', while the leading end of the picking bar 110' approaches to the inside of the supporting part 108. Accordingly, a 20 portion of the lifting belt 115 is engaged, and therefore, the lifting bracket 111 together with the guide bar 105

comes down in the direction of the arrow mark A along the lifting belt 115.

At the same time, the lifting bar 104 and the cleaving cap 102 vertically come down, while the cleaving cap 102 is uniformly winding the yarns to the cleaved yarn bobbins 13 as shown in FIG. 6.

If the upper portion of the lifting bracket 111 thus descending contacts to the contact terminal 217' of the movable beam 212, then the power to the solenoid 109' is disconnected, while the power is supplied to the solenoid 109. Therefore the actuation bar of the solenoid 109 is inserted into the body of the solenoid 109, while the leading end of the picking bar 110 approaches to the inside of the supporting part 108'. Accordingly, a portion of the lifting belt 115 is engaged, and therefore, the lifting bracket 111 together with the guide bar 105 rises up in the direction of the arrow mark B along the lifting belt 115.

Under this condition, owing to the balance weight 113 and owing to the lifting bar 104 and the cleaving cap 102, there is prevented the generation of any difference

between the ascending and descending velocities of the lifting bracket 111.

In this manner, the lifting bracket 111 performs reciprocating vertical movements between the upper and lower movable beams 211 and 212. Thus each time when the lifting bracket 111 contacts the contact terminal 217 or 217', the step motor 214 rotates the adjusting bar 209 in the forward direction in a repeating manner.

As a result, the upper and lower movable beams 211 and 212 move up and down along the adjusting bar 209 owing to the guide bar 210. Thus if the upper and lower movable beams 211 and 212 approach toward the middle portion of the adjusting bar 209, then the length of the vertical movements of the lifting bracket 111 is gradually shortened. Thus if the upper movable beam 211 contacts to the limit switch 218, then the driving motor 206 is stopped, resulting in that all the actuations are stopped (this is the completion of the winding of the cleaved yarns.)

Under this condition, if only the step motor 214 is activated to rotate the adjusting bar 209 in the reverse

direction, then the upper and lower movable beams 211 and 212 are moved away from each other until the limit switch 218' contacts to the separation adjustment bar 129. At this point, the step motor 214 is stopped (this is the
5 initial ready status for winding the cleaved yarns to the yarn bobbins)

Under this condition, the separation distance between the upper and lower movable beams 211 and 212 is adjusted to a length L over which the yarns are wound on
10 the cleaved yarn bobbins 13.

As described above, the operation is started from the initial ready status to wind the cleaved yarns to the cleaved yarn bobbins 13 by supplying the power to the driving motor 206. Then the operation of the winding of
15 the yarns is terminated, and then the winding operation is started again automatically. These automatic operations are controlled by the control part 220 which is connected to the driving motor 206, the contact terminals 217 and 217', the limit switches 218 and 218',
20 the step motor 214 and the solenoids 109 and 109'.

The present invention includes a guide part G for

measuring the yarn carriage length to automatically control the operation, and this guide part G is illustrated in FIGs. 7 to 9.

The yarn-cleaving machine according to the present
5 invention further includes:

a driving part 200 consisting of: a driving motor 206 as a revolution power source, a third tension belt 204' connected to the leading end pulley 205' of the driving motor 206, a second tension belt 204, an upper
10 pulley 203, and a spindle belt 210 as shown in FIG. 4;

a yarn receiving part consisting of: a power variable switch 311 for supplying the power to the driving motor 206 of the driving part 200, a plurality of cleaved yarn bobbin spindles 220 revolving by being connected to
15 spindle belts 210 of the driving part 200, and a plurality of cleaved yarn bobbins 13;

a yarn supply part 400 consisting of: a raw yarn bobbin 10 with a certain amount of a raw yarn wound thereon, a raw yarn drum 7 for fitting the raw yarn bobbin 10, and
20 a revolution shaft pin 6 for the raw yarn drum 7;

a yarn carriage length measurement part 500

consisting of: a rotatable rolling device 322 including a hub of a shaft hole 317, a plurality of through holes 318 and a plurality of rim parts 319 formed between the hub and the outer circumference, a shaft pin 320, and a
5 round bearing 321; a revolution value sensor 323 disposed on the axis of each of the through holes 318, with its leading end approaching to the rear face of the rolling device 322, and with its rear end fixed to a frame 303;

a display part 600 consisting of: a digital display
10 A (324) for displaying in numerals the revolution value of the rolling device 322 as sensed by the revolution value sensor 323, and a digital display B (325) for inputting a reference revolution value of the rolling device 322; and

15 a second control part 326 for receiving an information from the revolution value sensor 323 to display in numerals the received information to the digital display A (324), and for comparing the received current information of the revolution value sensor 323
20 with the reference revolution value of the digital display B (325) so as to decrease the revolution value

of the driving motor 206 upon finding a closeness of the current information to the reference revolution value, and so as to stop the driving motor 206 upon finding a correspondence between the current information and the
5 reference revolution value, this being done by controlling a power variable switch.

The driving part 200 and the control part for controlling the driving part 200 are installed within the base body 101. The yarn receiving part 300 is installed
10 in the upper portion of the base body 101, in connection to the driving part 200.

The yarn supply part 400 is rotatably installed on a plate 302 which perpendicularly extends from a side of the base body 101.

15 The yarn carriage length measurement part 500 is installed on a frame 103 which projects from a side of the base body 101 to between the yarn receiving part 300 and the yarn supply part 400.

Now the present invention constituted as above will
20 be described as to its action and effects.

First, the raw yarn bobbin 10 with the raw yarn 127

wound thereon is fitted to the raw yarn drum revolution pin 6, while a plurality of empty cleaved yarn bobbins 13 are fitted to the cleaved yarn bobbin spindles 220.

Then by using hands, each of the leading ends of the
5 cleaved yarn strands is wound on each of the cleaved yarn bobbins 13.

Under this condition, the yarns are made contacted to the outer circumference of the rolling device, with the tensions of the yarns (raw yarn and cleaves yarns)
10 being made tight.

Thereafter, if the driving motor 206 is driven to rotate the cleaved yarn bobbin spindles 220, then the cleaved yarns are wound on the respective cleaved yarn bobbins 13, and at the same time, the raw yarn bobbin 10
15 and the raw yarn drum 7 and the raw yarn drum revolution pin 6 are revolved owing to the unwinding motions of the yarn 11.

Accordingly, the yarn 327 is continuously unwound away from the raw yarn bobbin 10 so as to be wound on the
20 respective cleaved yarn bobbins 13.

Thus according as the yarn 11 is carried from the

raw yarn bobbin 10 to the cleaved yarn bobbins 13, the rolling device 322 rotates in the direction of the carriage of the yarn 11.

Under this condition, as the rolling device rotates, the through holes 318 and the rim parts 319 alternately pass over the leading end of the revolution sensor 323, and therefore, the magnetic field of the leading end of the revolution sensor 323 is momentarily and repeatedly varied.

The current information as sensed by the revolution sensor 323 is inputted into the second control part 326 on the real time basis, and therefore, the second control part 326 displays in numerals the current information to the digital display A (324).

In this manner, the revolution value of the rolling device 322 can be known by reading the numerals on the digital display A (324), and therefore, the total length of the cleaved yarns as wound on the cleaved yarn bobbins 13 can be known.

That is, the number of the through holes 318 (or the number of the rim parts 319) of the rolling device 322

is four, and therefore, if the figure as displayed on the digital display A (324) is divided by 4, then the revolution value of the rolling device 322 can be known. Accordingly, the total length of the cleaved yarns 11 as wound on the cleaved yarn bobbins 13 can be calculated based on the following formula:

$$L = N \times (\Phi \times \ell) \text{ ----- } (Z)$$

$$* N = C \div D$$

where L is the total length of the cleaved yarn as wound on the cleaved yarn bobbins; N is the number of the revolutions of the rolling device; C is the figures displayed on the digital displays A and B; D is the number of the through holes of the rolling device; Φ is 3.14; and ℓ is the diameter of the yarn-guiding and -carrying pulley.

*Remarks: if the number D of the through holes of the rolling device is larger, so much more accurately the total length L can be calculated.

Therefore, in the actual operations, first the yarn 327 is connected to the cleaved yarn bobbins 13 with hands,

and then, the total length L as will be displayed on the digital display A (324) is calculated in advance based on the above formula Z. Then the calculated figure is inputted into the digital display B (325).

5 Thereafter, if the driving motor 206 is activated to continuously wind the cleaved yarns to the cleaved yarn bobbins 13, then the numerals of the current information are displayed on the digital display A (324) continuously.

10 Then, according as the figures of the digital display A (324) approach the figures of the digital display B (325), the driving motor 206 is gradually slowed down. Thereafter, if the figures of the digital display A (324) exactly corresponds to the figures of the digital display
15 B (325), then the second control part 326 controls the power variable switch 311 to completely stop the driving motor 206.

That is, the second control part 326 controls the power variable switch 311 in such a manner that the switch
20 would gradually decrease the supply of power until it completely stops the supply of power.

In this manner, the revolutions of the driving motor 206 is gradually slowed down and then completely stopped, and the revolutions of the yarn receiving part 300 and the yarn supply part 400 are also slowed down and then
5 completely stopped.

Accordingly, the yarns 327 are wound on the cleaved yarn bobbins 13 as much as the pre-set figures (reference value) of the digital display B (325).

Further, as shown in FIGs. 10 to 15, the raw yarn
10 tension adjustment device 700 is constituted such that:
a securing part 420 is installed on the raw yarn drum frame 2 of a side of the yarn-cleaving machine so as to be rotated interlockingly to the cleaved yarn bobbins 13 by being located at the rear of the raw yarn drum revolution pin
15 6;

the securing part 420 has an open side to be secured to the outside of a securing bearing 421 of the raw yarn drum revolution pin 6 by means of a securing bolt 422 so as to form a securing brim 424 forming a pair of securing
20 brackets 423; and

a securing rod 426 having a securing slot 425 is

secured to a rear portion of the securing brim 424 by bolting, and a wheel pin 428 with an actuation piece 427 formed thereon is formed on another rear portion of it together with a bearing 429, and a connection piece 431
5 with a plurality of securing holes 430 formed therein is formed on a front portion of it so as to rotate the wheel pin 428.

One end of each of the brake shoes 441 of the tension adjustment part 440 is installed in the securing slot 425
10 of the securing rod 426 which is secured to the securing part 420 as described above. The other ends of the brake shoes 441 are installed on the actuation piece 427 of the wheel pin 428 to be elastically installed to the securing rod 426 by means of a connection spring 442. A lining
15 443 is attached on the outside of the brake shoe 441 so that a gentle braking can be realized. A brake drum 444 which surrounds the outside of the brake shoes 441 is secured to the rear end of the raw yarn drum revolution pin 6. Thus if the pair of the brake shoes 441 are spread
20 out, they are subjected to frictions by being contacted onto the inner circumference of the brake drum 444,

thereby adjusting the tension.

For the action of the tension adjustment part 440,
a tension transmission rod 451 of the tension
transmission part 450 is connected to the upper portion
5 of the connection piece 431 of the securing part 420. The
upper portion of the tension transmission rod 451 is
connected through a connection bearing 452 to a tension
rod 408 which is disposed at a side of the yarn-cleaving
machine to move up and down in accordance with the tension
10 of the raw yarn.

One end of the tension adjustment spring 461 of the
tension setting part 460 is connected to the other end
of the tension transmission part 450. The other end of
the tension adjustment spring 461 of the tension setting
15 part 460 is connected to the actuation device 462, and
the actuation device 462 is provided with a guide hole
463 on its one side, while the actuation device 462 is
provided with a spiral hole 464 in its inside.

An actuation rod 466 is provided with actuation
20 threads on its outside, so as to move the actuation device
462 up and down and so as to adjust the tension by being

coupled to the threaded hole 464 of the inside of the
actuation device 462, thereby making it possible to set
up the initial tension. For this purpose, an adjustment
handle 467 is formed on the top of the actuation rod 466,
5 so that the actuation device would move up and down in
accordance with the rotations of the actuation rod 466.

Further, the guide rod 468 which is inserted into
the guide hole 463 is secured to the horizontal frame of
the raw yarn drum frame 2, so that the actuation device
10 462 would move up and down through the guide hole 463
during the rotations of the actuation rod 466.

Now the present invention constituted as above will
be described as to its action and effects.

First, the raw yarn is engaged to an engaging rod
15 414 of the tension rod 408, and then is engaged to the
guide roller 9 of the raw yarn drum frame 2. Then the
raw yarn is engaged to both ends of the tension rod 408,
and is cleaved into a plurality of yarn strands to be
engaged to a plurality of guide rollers 9 and 9'. Then
20 the cleaved yarn strands are engaged to a plurality of
guide hooks 12 respectively to be wound on a plurality

of cleaved yarn bobbins 13 respectively.

Under this condition, the guide cap 4 moves up and down together with the plurality of the cleaved yarn bobbins 13, so that the cleaved yarn would be uniformly wound on the cleaved yarn bobbins 13 respectively.

Under this condition, when the guide cap 4 moves up and down, or due to the revolution power of the driving motor for rotating the plurality of the cleaved yarn bobbins 13, the tension which transmitted to the raw yarn 11 is frequently varied.

Thus if the tension transmitted to the raw yarn 11 is varied, then the tension rod 408 is subjected to scissor movements in accordance with the variations of the tension, because the yarn passes along the both ends of the tension rod 408.

Thus if the tension rod 408 performs the scissor movements, then the tension transmission rod 451 of the tension transmission part 450, which is interlocked to the tension rod 408, is also subjected to scissor movements. Then the transmission rod 453 of the end of the tension transmission rod 451 moves up and down, so

that the revolutions of the raw yarn drum revolution pin 6 are adjusted by the tension adjustment part 440.

That is, if the tension is intensified by an external condition, one end of the tension rod 408 which lies on the same straight line as the tension transmission rod 451 (which is connected to the tension adjustment spring 461 of the tension setting part 460) ascends, while the tension transmission rod 451 interlockingly descends, with the tension adjustment spring 461 being extended.

Thus, if the transmission rod 453 descends, then the connection piece 431 which is connected to the lower end of the transmission rod 453 descends. At the same time, the wheel pin 428 on which the connection piece 431 is secured is rotated to cause the actuation piece 427 of the wheel pin 428 to be disposed in the horizontal posture. As a result, the brake shoes 441 are separated from the brake drum 444, and therefore, the revolution shaft pin 6 smoothly revolves, resulting in that the tension imposed on the raw yarn 11 is released.

In this manner, if the value of the tension imposed on the raw yarn 11 decreases to below a certain value,

then the tension adjustment spring 461 of the tension transmission rod 451 is pulled, while the tension rod 408 also performs the interlocked motions.

Thus if the transmission rod 451 is inclined by the
5 tension adjustment spring 461 by overcoming the tension,
then the transmission rod 453 rises, and at the same time,
an end of the connection piece 431 of the securing part
420 which is connected to the transmission rod 453 also
rises to cause the wheel pin 428 to be rotated, thereby
10 making the actuation piece 427 depart from the horizontal
position. Therefore, like a virtual line of FIG. 5, the
pair of the brake shoes 441 are spread out, resulting in
that the linings 443 of the brake shoes 441 are
press-contacted to brake the revolutions of the raw yarn
15 drum revolution pin 6. Consequently, the loosened
tension is tightened.

In this manner, the tension which is transmitted to
the raw yarn 11 by the tension transmission part 450 is
adjusted by the braking action of the tension adjustment
20 part 440, thereby adjusting the tension of the raw yarn
11.

Meanwhile, the initial tension setup value is determined through the tension setting part 460. That is, the initial tension is adjusted in the following manner. If the adjustment handle 467 of the actuation
5 rod 466 is rotated to lower the actuation device 462, then the tension of the tension adjustment spring 461 is intensified to pull one end of the tension transmission rod 451, thereby intensifying the tension of the raw yarn. On the other hand, if the adjustment handle 467 of the
10 actuation rod 466 is rotated in the opposite direction to raise the actuation device 462, then the tension of the tension adjustment spring 461 becomes weak, resulting in that the force of pulling the tension adjustment spring becomes weak. As a result, the force of pulling one end
15 of the tension transmission rod 451 becomes weak, thereby making it possible to set the tension of the raw yarn at a low level.

Thus if the pitches of the actuation spiral threads 465, which is formed on the actuation rod 466 of the
20 tension adjustment part 440, are made wide together with the spiral threads of the insides of the actuation device

462, then a slight rotation of the adjustment handle 467 will achieve the purpose of setting the tension of the yarn. Further, a plurality of the tension adjustment parts and a plurality of the raw yarn bobbins can be
5 installed as shown in FIG. 15, thereby improving the productivity.

Meanwhile, a raw yarn bobbin-securing device 800 of the yarn-cleaving machine according to the present invention is illustrated in FIGs. 16 to 19.

10 As shown in these drawings, the raw yarn bobbin securing device 800 includes: a raw yarn drum revolution pin 508 with a nut hole 506 formed in a leading end of it to a certain depth, and with a fastening key 507 projecting from an outside circumference of it;

15 a raw yarn drum 512 for fitting a bobbin, with a revolution pin 508 being axially installed therein, with a left drum 509 and a right drum 511 each having an annular recess, and with the right drum 511 having a key slot 507';
a plurality of bolt bars 516 for fastening the left and
20 right drums 509 and 511 to the intermediate drum 510 in the axial direction; an adjustment bolt 517 for being

fastened into the nut hole 506 to make it advance and withdraw in the axial direction by turning it forward or reverse; a tension spring 518 axially installed between a head of the adjustment bolt 517 and the left drum 509, 5 for pressing the left drum 509 in the axial direction; and a plurality of annular elastic members 519 respectively settled in the annular recesses 515 of the left and right drums 509 and 511, for being expanded in a radial direction upon close contact of the respective 10 drums.

The left drum 509 and the right drum 511 are respectively provided with a shaft hole 514 for inserting the revolution pin 508.

Annular recess parts 520' and 520 are formed in the 15 left face of the left drum 509 and the right face of the right drum 511, so that the bolt bars 516 would not protrude. Further, core parts 521 are formed on the left and right drums 509 and 511, for guiding them.

The right drum 511 is provided with a bobbin settling 20 part 522 for settling the raw yarn bobbin 10.

The intermediate drum 510 is provided with an

elongate hole 513 for receiving the core parts 521 of the left and right drums 509 and 511.

The length of each of the core parts 521 is less than half of the total length of the intermediate drum 510.

5 The left and right drums 509 and 511 are provided with a plurality of through-holes 523 for fastening the left and right drums 509 and 511 to the intermediate drum 510, while the intermediate drum 510 is provided with a plurality of nut holes 524.

10 The through holes 523 have an inside diameter large enough to smoothly receive the bodies of the bolt bars 516, while the nut holes of the intermediate drum 510 are just suitable for receiving the end portions of the bolt bars 516.

5 The through holes 523 and the nut holes 524 are formed on the same circumference level. That is, at the same radial distance from the revolution pin 508, they are formed radially inwardly from the annular recesses 515 and 515'.

0 The adjustment bolt 517 is provided with an annular projection part 517' with the same diameter as the

revolution shaft 508.

This will be described in more detail as to its assembled state referring to FIGs. 16 and 17.

First, as shown in FIG. 16, the core parts 121 of
5 the left and right drums 109 and 111 are inserted into
the elongate hole 113 of the intermediate drum 110 from
the opposite ends of the intermediate drum 111. During
this assembling, the annular elastic members 119 are
installed into the annular recesses 115' of the left and
10 right drums 109 and 111.

Then the bolt bars 116 are inserted through the
through holes 123 of the left and right drums 109 and 111
into the nut holes 124 of the left and right faces of the
intermediate drum 110, thereby firmly coupling the left
15 and right drums 109 and 111 to the intermediate drum 110.

Under this condition, the fastened bolt bars 116 are
disposed radially inwardly from the annular elastic
members 119.

Further, the bolt bars 116 have a certain extra
20 length, so that the left and right drums 109 and 111 can
be slidably separated from the intermediate drum 111 by

a certain distance in the axial direction.

In this raw yarn drum 112, the assembling sequence of the drums is the right drum 111 → the intermediate drum 110 → the left drum 109. The leading end of the
5 revolution pin 108 is projected beyond the left face of the left drum 109.

Further, a key 107 is inserted into the key slot 107' of the right drum 111, and therefore, when the revolution pin 108 revolves, the raw drum 112 revolves together with
10 the revolution pin 108 in the same direction.

Further, when fastening the leading end of the adjustment bolt 117 into the nut hole 106, the tension spring 118 exerts forces both onto the head of the adjustment bolt 117 and the left drum 109 in the axial
15 direction.

Under this condition, the body of the adjustment bolt 117 is inserted from the left end of the tension spring 118, while the end of the revolution pin 108 is inserted from the right end of the tension spring 118. Therefore,
20 the adjustment bolt 117 can be smoothly advanced when fastening it.

Now the present invention will be described in more details.

First, as shown in FIG. 18, the raw yarn bobbin 102 is fitted to the raw yarn drum 112, and its end portion
5 is settled to the settling part of the right drum 111, while the right drum 111 is contacted to a revolution shaft housing 105 which is secured to the frame 104.

Thereafter, as shown in FIG. 19, if the adjustment bolt 117 is rotated in the forward direction to advance
10 its head toward the left drum 109, then the left and right drums 109 and 111 are closely contacted to the intermediate drum 110, and therefore, the annular recesses 115' of the left and right drums 109 and 111 and the annular recess 115 of the intermediate drum 110 are
15 formed into V-shaped annular recesses. At the same time, the annular elastic members 119 are expanded outward in the radial direction, resulting in that the annular elastic members 119 press onto the inner circumference of the raw yarn bobbin 102.

20 Accordingly, the raw yarn bobbin 102 cannot be slipped around the raw yarn drum 112 owing to the pressing

of the annular elastic members 119, and therefore, the raw yarn bobbin 102 cannot make any idle revolutions.

That is, either during low speed revolutions or high speed revolutions, the elements such as the revolution
5 pin 108, the raw yarn drum 112 and the raw yarn bobbin 102 do not make idle revolutions.

Under this condition, the pressing forces of the annular elastic members 119 should be properly adjusted by taking into account the residual amount of the raw yarn
10 on the raw yarn bobbin 102.

Thereafter, if the raw yarn bobbin is to be detached from the raw yarn drum 112, the adjustment bolt 117 is rotated in the reverse direction to make the adjustment bolt 117 withdraw from the left face of the left drum 109.
15 Thus the force of the tension spring 118 is weakened, and therefore, the annular elastic members 119 are contracted, while the left and right drums 109 and 111 are separated from the intermediate drum 110. As a result, the pressing force acting on the inner circumference of the raw yarn
20 bobbin 102 is dissipated, and therefore, the raw yarn bobbin 102 can be easily taken out from the raw yarn bobbin

drum 112.

According to the present invention as described above, the inner circumference of the raw yarn bobbin is pressed with a plurality of annular elastic members, and therefore, either at low speed revolutions or high speed revolutions, the raw yarn bobbin can be prevented from idle revolutions. Further, the lifting part moves up and down without any acceleration and deceleration, and therefore, the cleaved yarns are uniformly wound on the cleaved yarn bobbins.

Further, the cleaved yarns are wound on the bobbins conically at both ends of the bobbins, and therefore, the wound contour is not deformed when carrying or filing them.

The total length of the cleaved yarns to be wound is set in advance, and the winding of the yarns is carried out as much as the pre-set amount. Accordingly, the yarn carriage deviation tolerance is minimized, and the manpower cost can be curtailed. Further, the tension of the raw yarn during its unwinding can be automatically adjusted so as to control the incidental variation of the

tension of the raw yarn during the operation, and therefore, the tension of the raw yarn can be optimally maintained.

In the above, the present invention was described based on the specific preferred embodiments and the
5 attached drawings, but it should be apparent to those ordinarily skilled in the art that various changes and modifications can be added without departing from the spirit and scope of the present invention, which will be defined in the appended claims.

WHAT IS CLAIMED IS:

1. A yarn-cleaving machine comprising:

a base body with a raw yarn frame, a rectangular piped
5 frame and power devices installed therein;

a yarn cleaving part installed above the base body,
and including a yarn cleaving guide cap and a plurality
of cleaved yarn bobbins;

a driving part installed within the base body, for
10 lifting or rotating the yarn-cleaving part;

a raw yarn drum-securing part installed under a raw
yarn drum frame, for securing the raw yarn drum;

a raw yarn tension-adjusting device installed above
the raw yarn drum frame, for adjusting a tension of the
15 raw yarn; and

a guide part consisting of a plurality of guide
rollers and formed above the tension-adjusting device,
characterized in that:

the driving part comprises a lifting bar, the lifting
20 bar being installed within the base body through a
vertical guide cylinder of a central top of the base body,

an upper end of the lifting bar being attached to a bottom center of a round conical cap, the round conical cap including a plurality of guide hooks at certain constant intervals; and a vertical guide bar is secured in front of and separatedly from the lifting bar, with both ends of the guide bar being secured to upper and lower inside portions of the base body, a pair of solenoids being installed on a pair of supporting parts in mutually opposite directions, one end of each of a pair of picking bars being hinge-connected to each of actuation bars of the solenoids, other ends of the picking bars being contacted to inner portions of the supporting parts, and a lifting bracket supporting the pair of the picking bars;

a lifting power part comprises a lifting pulley, the lifting pulley being installed in an upper portion of the base body, a belt engaged to the lifting pulley passing through between ends of the picking bars and the supporting parts of the lifting bracket, an output pulley of a decelerator being installed directly below the lifting pulley and in a lower portion of the base body, and an input pulley of the decelerator being connected

through a first tension belt, lower and upper pulleys of a passive revolution shaft, a second tension belt, an intermediate pulley, a third tension belt and a driving motor;

5 a lift adjustment part comprises an adjustment bar and a guide bar disposed between upper and lower plates, the adjustment bar being rotatably installed, both ends of the guide bar being fixed, upper and lower movable beams being installed on the adjustment bar with a certain gap
10 between the two beams, the lifting bracket being disposed between the upper and lower movable beams, one ends of the movable beams interfering to the lift bracket, and other ends of the movable beams being connected to the guide bar;

15 a sensing part comprises a step motor disposed on a bottom of the adjustment bar, the step motor being meshed to first and second pinion gears, the upper and lower movable beams being provided with contact terminals respectively, a limit switch being installed on the guide
20 bar so as to be contacted to other ends of the movable beams, and a gap adjustment bar being installed on an end

of the lower plate; and

a control part for driving the step motor by certain angular degrees in response to sensed signals of the contact terminals, for supplying a power to the solenoids,
5 and for supplying or withholding the power to and from the driving motor.

2. The yarn-cleaving machine as claimed in claim 1, wherein the adjusting bar is provided with two sets of
10 thread parts on upper and lower portions thereof in mutually opposite directions, and if the adjusting bar is rotated by a step motor in a forward direction, the two movable beams approach to each other, and if the adjusting bar is rotated in a reverse direction, the two
15 movable beams move away from each other.

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3. The yarn-cleaving machine as claimed in claim 1, further comprising:

a yarn carriage length measurement part consisting
20 of: a rotatable rolling device including a hub of a shaft hole, a plurality of through holes and a plurality of rim

parts formed between the hub and the outer circumference,
a shaft pin, and a round bearing; and a revolution value
sensor disposed on the axis of each of the through holes,
with its leading end approaching to the rear face of the
5 rolling device, and with its rear end fixed to a frame;

a display part consisting of: a digital display A
for displaying in numerals the revolution value of the
rolling device as sensed by the revolution value sensor,
and a digital display B for inputting a reference
10 revolution value of the rolling device; and

a second control part for receiving an information
from the revolution value sensor to display in numerals
the received information to the digital display A, and
for comparing the received current information of the
15 revolution value sensor with the reference revolution
value of the digital display B so as to decrease the
revolution value of the driving motor upon finding a
closeness of the current information to the reference
revolution value, and so as to stop the driving motor upon
20 finding a correspondence between the current information
and the reference revolution value, this being done by

controlling a power variable switch.

4. The yarn-cleaving machine as claimed in claim 1,
wherein the tension-adjusting device comprises:

5 a securing part installed on a raw yarn drum frame
of a side of the yarn cleaving machine to be rotated
interlockingly to the cleaved yarn bobbins, and secured
to a fixed bearing by means of a bolt, and having a securing
rod with a securing slot formed on a securing edge, and
10 having a rotatable wheel pin on another side, the wheel
pin being rotated by a connection piece, and the connection
piece being secured to the securing part;

 a tension adjustment part, with its one end being
installed in the securing slot of the securing rod of the
15 securing part, with its another end being installed on an
actuation piece of the wheel pin, with a pair of brake shoes
being installed on a connection spring of the securing rod,
with a lining being formed on each of the brake shoes to
surround its outside, and with a brake drum being secured
20 to a rear end of the raw yarn drum revolution pin so as
to be interlockingly revolved together with the raw yarn

drum revolution pin;

a tension transmission part, with a tension transmitting rod being connected to the connection pin of the securing part to decelerate the tension adjustment
5 part, with an upper end of the tension transmitting rod being connected to a tension rod, and the tension rod moving up and down in accordance with the tension of the raw yarn, so as to transmit the tension of the raw yarn; and

10 a tension setting part, with one end of a tension adjustment spring being connected to another end of the tension transmission part, another end of the tension adjustment spring being connected to an actuation device, the actuation device having a guide hole on one side and
15 a spiral slot in its inside, with an adjustment handle being formed to cause the actuation device to move up and down, with an actuation rod having a spiral lines on its outside, and with a guide rod being inserted into the guide hole to make the actuation device move up and down without
20 being rotated.

5. The yarn-cleaving machine as claimed in claim 1,
wherein the raw yarn drum-securing part comprises:

the raw yarn drum revolution pin, with a nut hole
being formed in its leading end in an axial direction, and
5 with a fastening key projecting from its outside;

a raw yarn drum axially installed to the raw yarn
drum revolution pin, and including a left drum and an
intermediate drum, and including a right drum, the two
drums (left and right drums) having annular recesses
10 respectively, the right drum having a key slot in the axial
direction;

a plurality of bolt bars for fastening the left and
right drums to the intermediate drum;

an adjustment bolt for being fastened into the nut
15 hole to perform reciprocation movements during
forward/reverse revolutions over a certain distance;

a tension spring installed between a bottom of a head
of the adjustment bolt and the left drum to press the left
drum in the axial direction; and

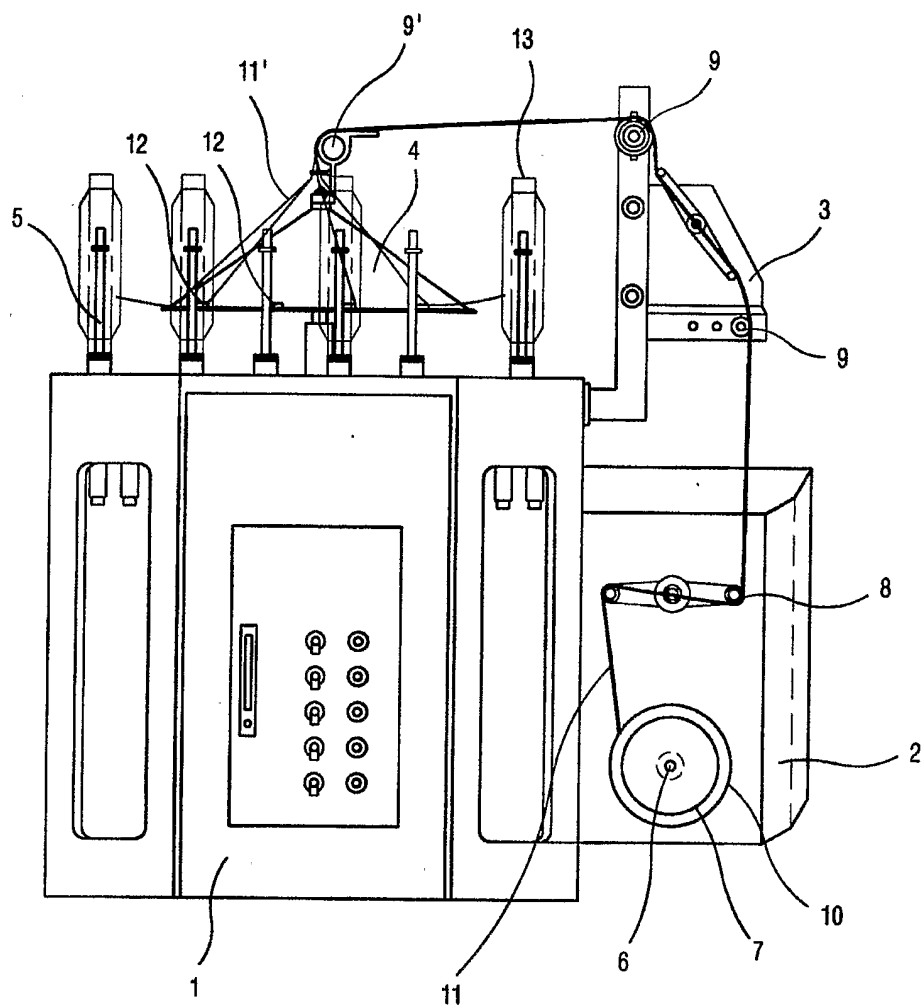
20 annular elastic members axially installed within
annular recesses of the left and right drums so as to be

expanded in the radial direction upon a close contact of the drum.

6. The yarn-cleaving machine as claimed in claim 5,
5 wherein each of the left and right drums has an axial hole for receiving the revolution pin; core parts are formed on each of the left and right drums; an elongate hole is formed through an axis of the intermediate drum to receive the core parts; recessed parts are formed in a left face
10 of the left drum and in a right face of the right drum so as to prevent the bolt bars from protruding; and an annular settling part is formed on an outside circumference of the right drum, for the raw yarn bobbin.

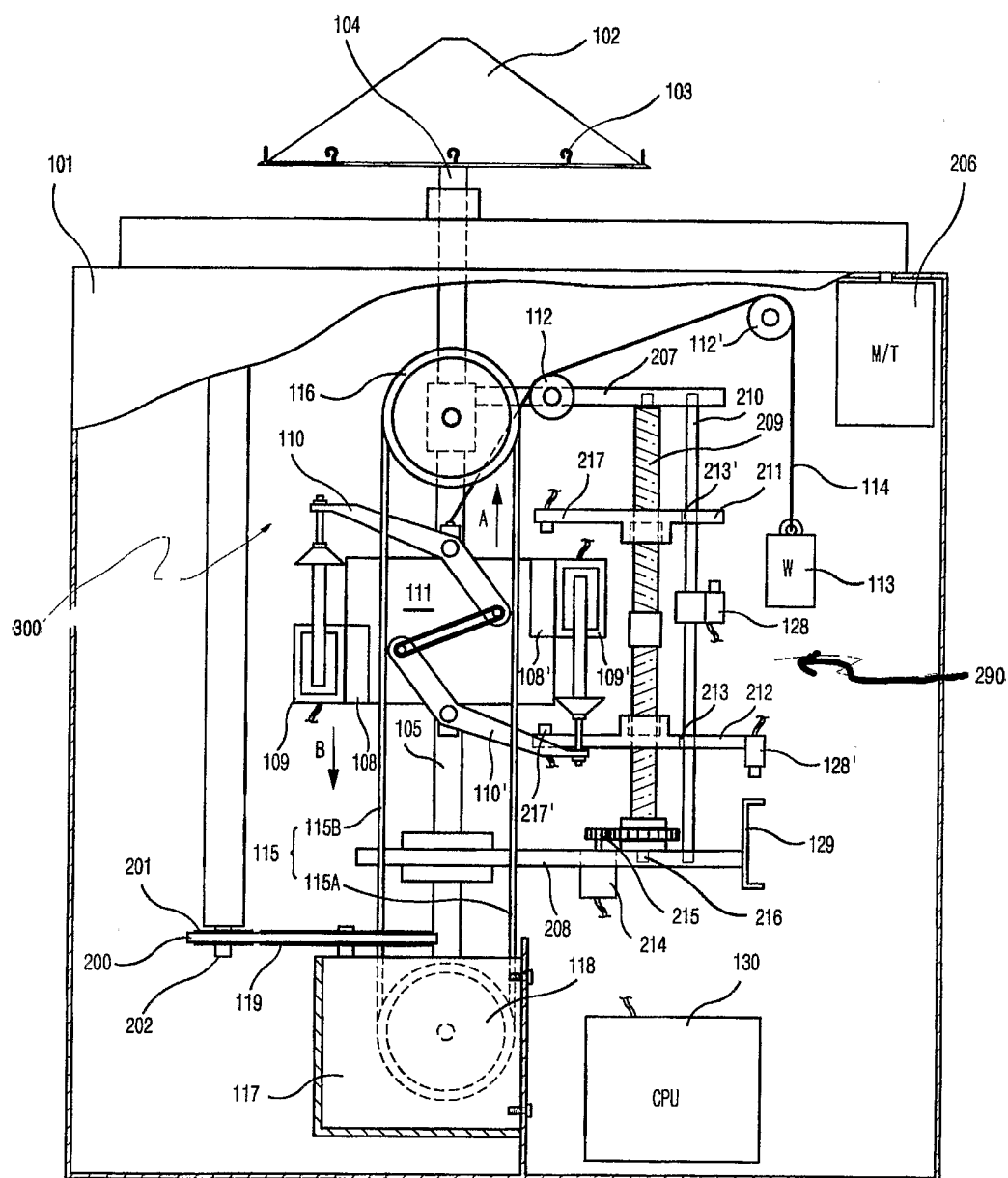
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Fig. 1



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Fig. 2



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Fig. 3

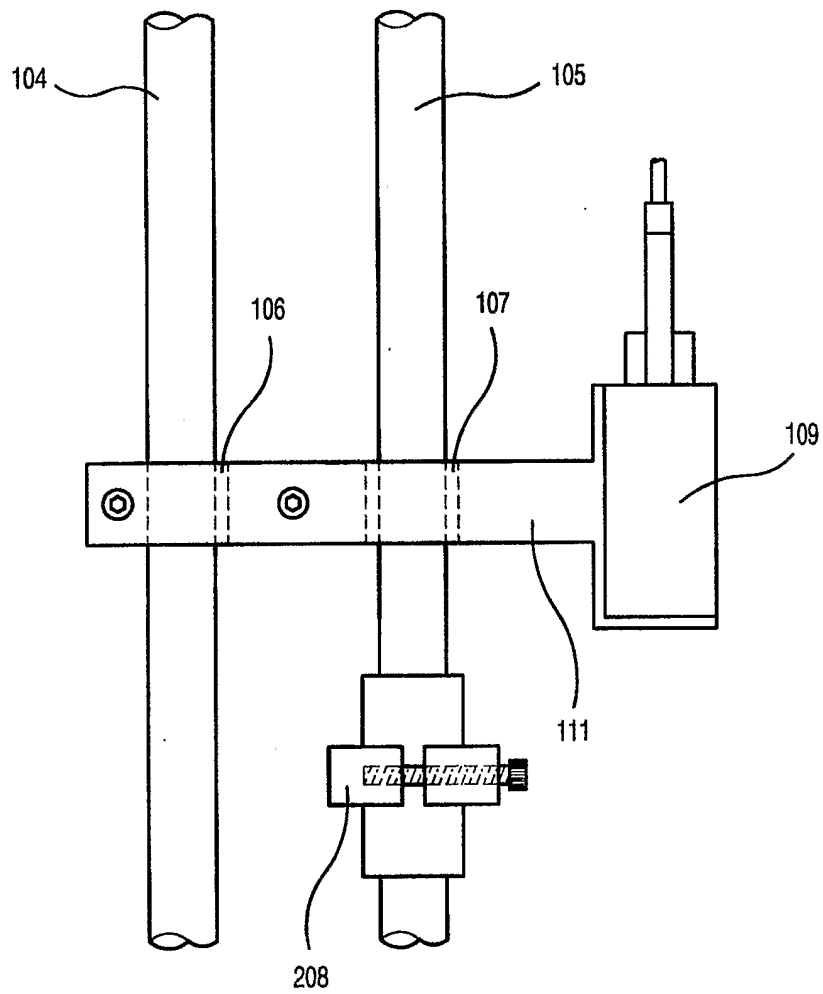
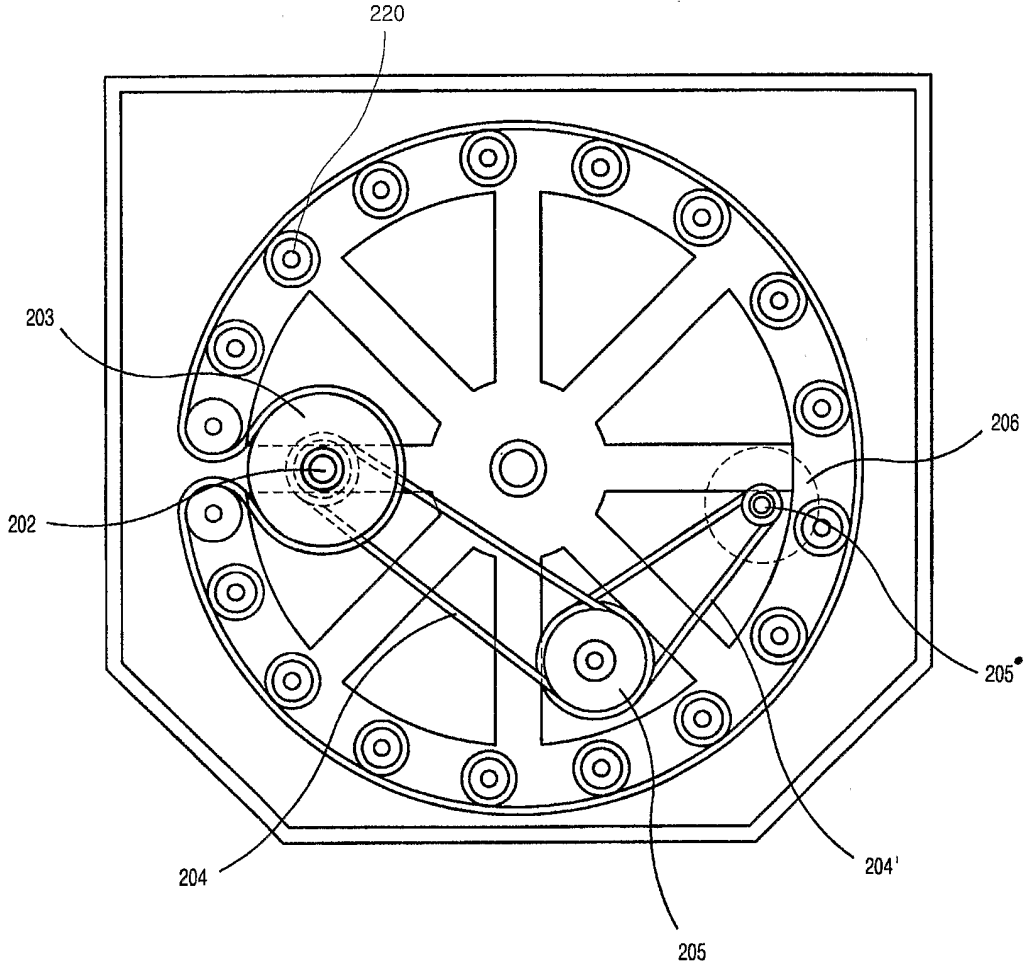
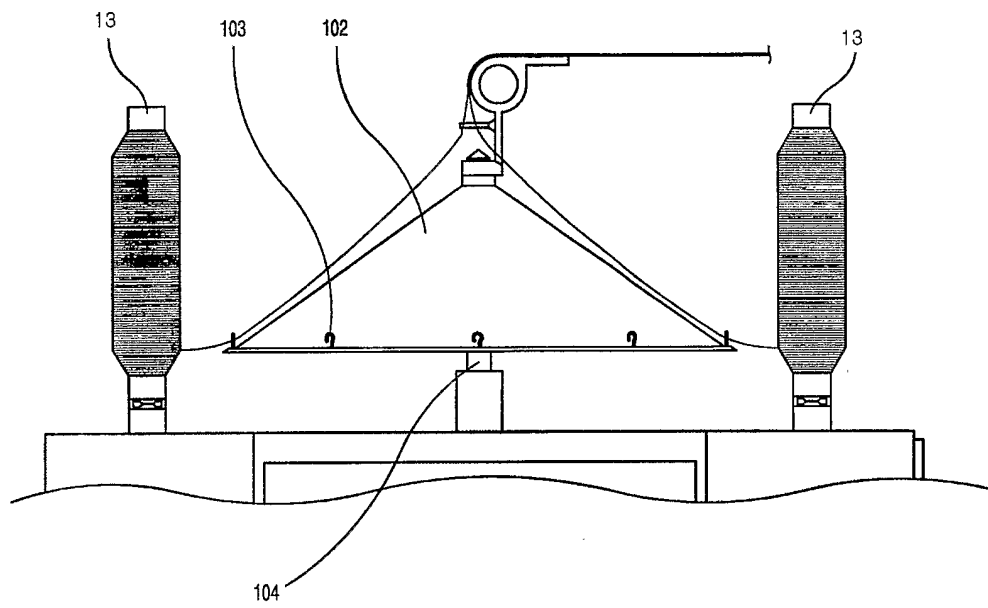


Fig. 4



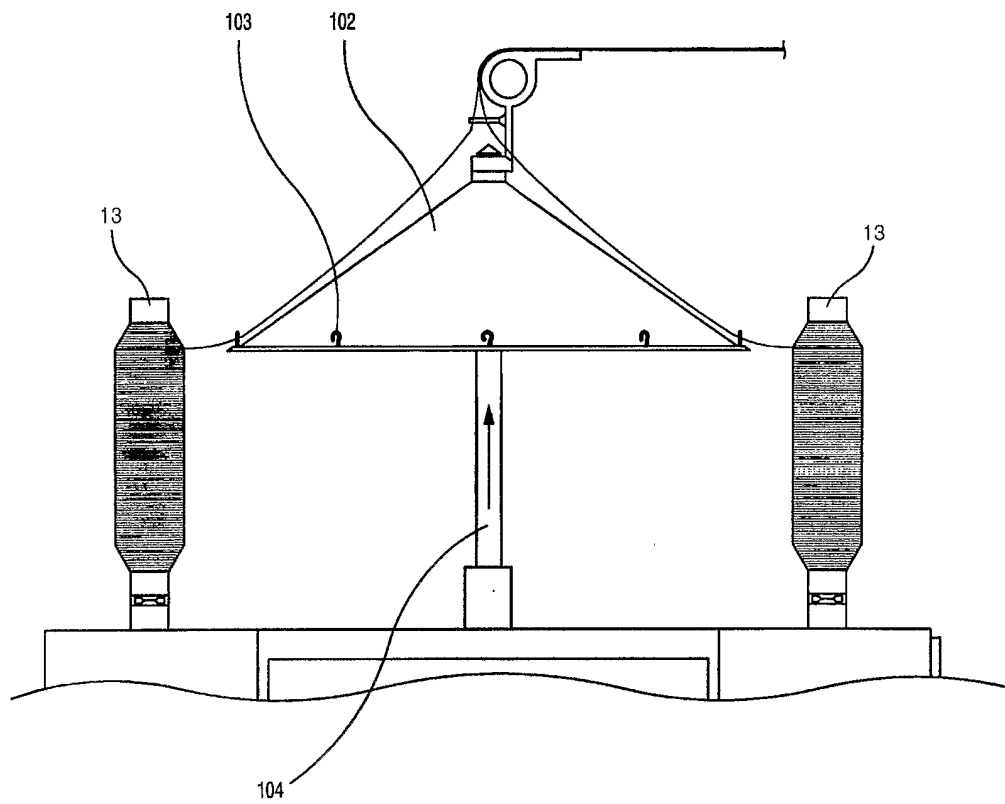
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Fig. 5



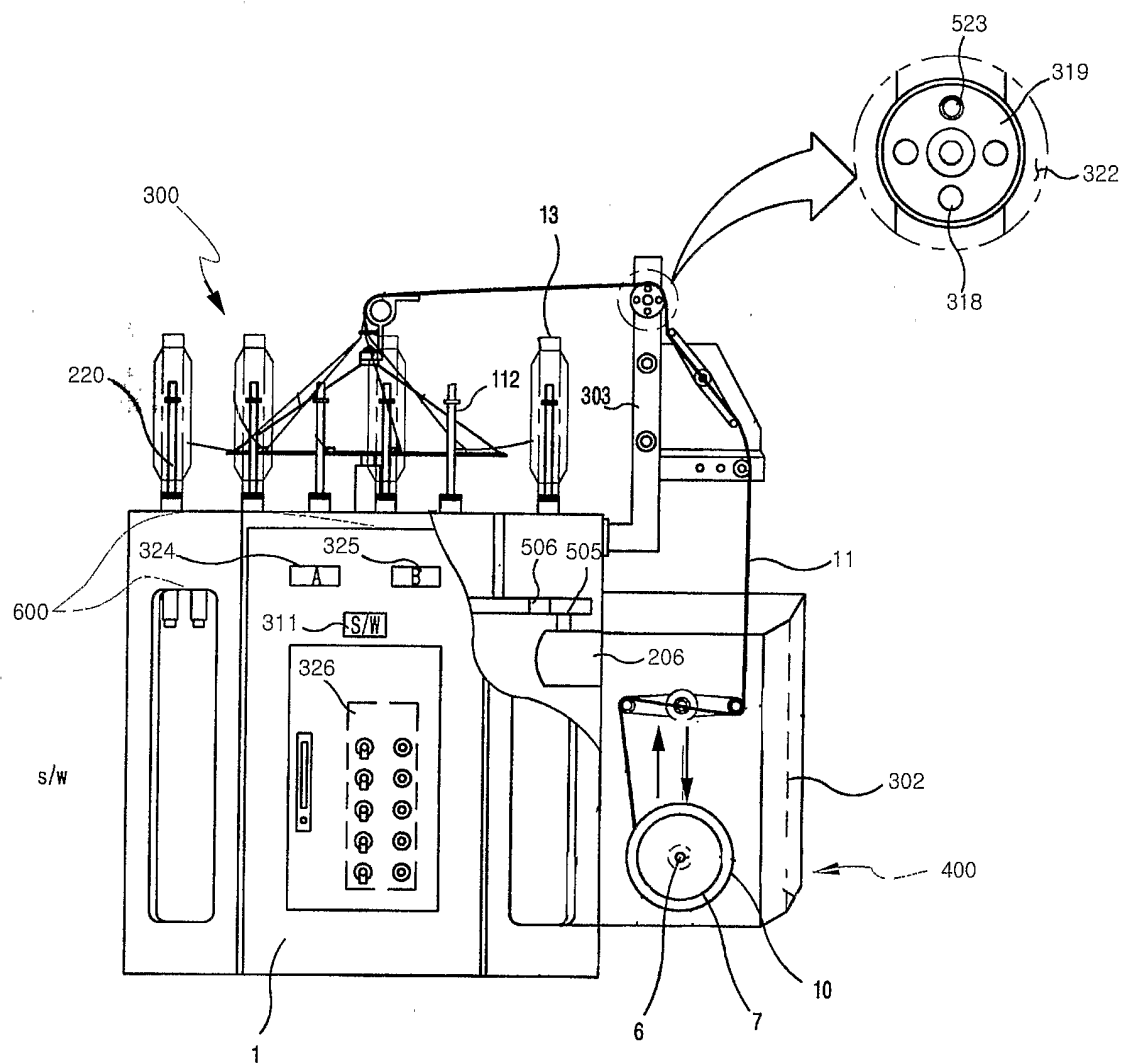
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Fig. 6



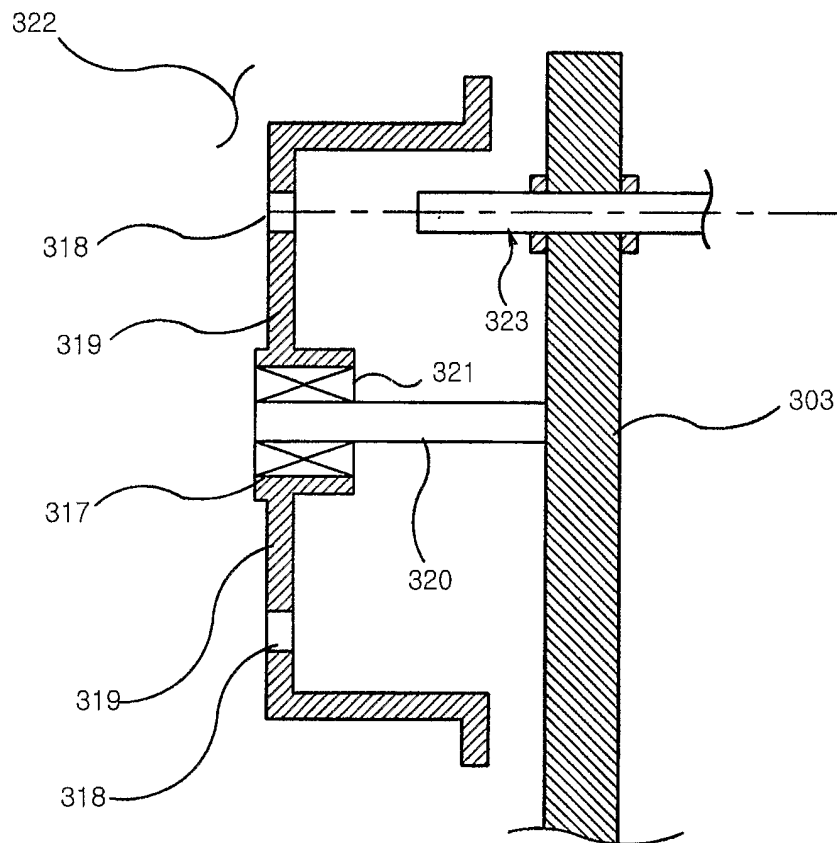
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Fig. 7



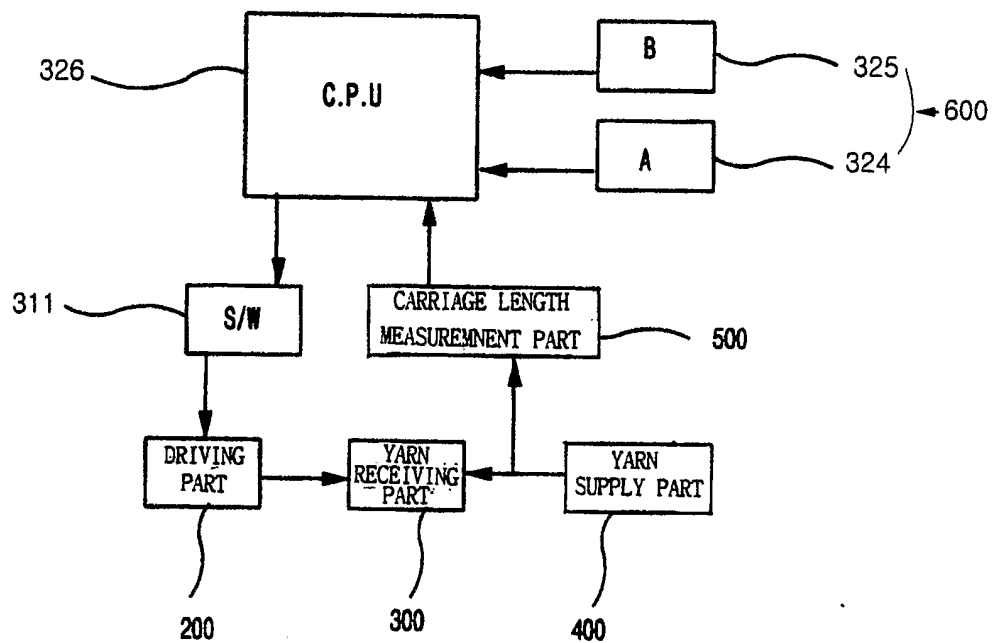
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Fig. 8



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Fig. 9



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Fig. 10

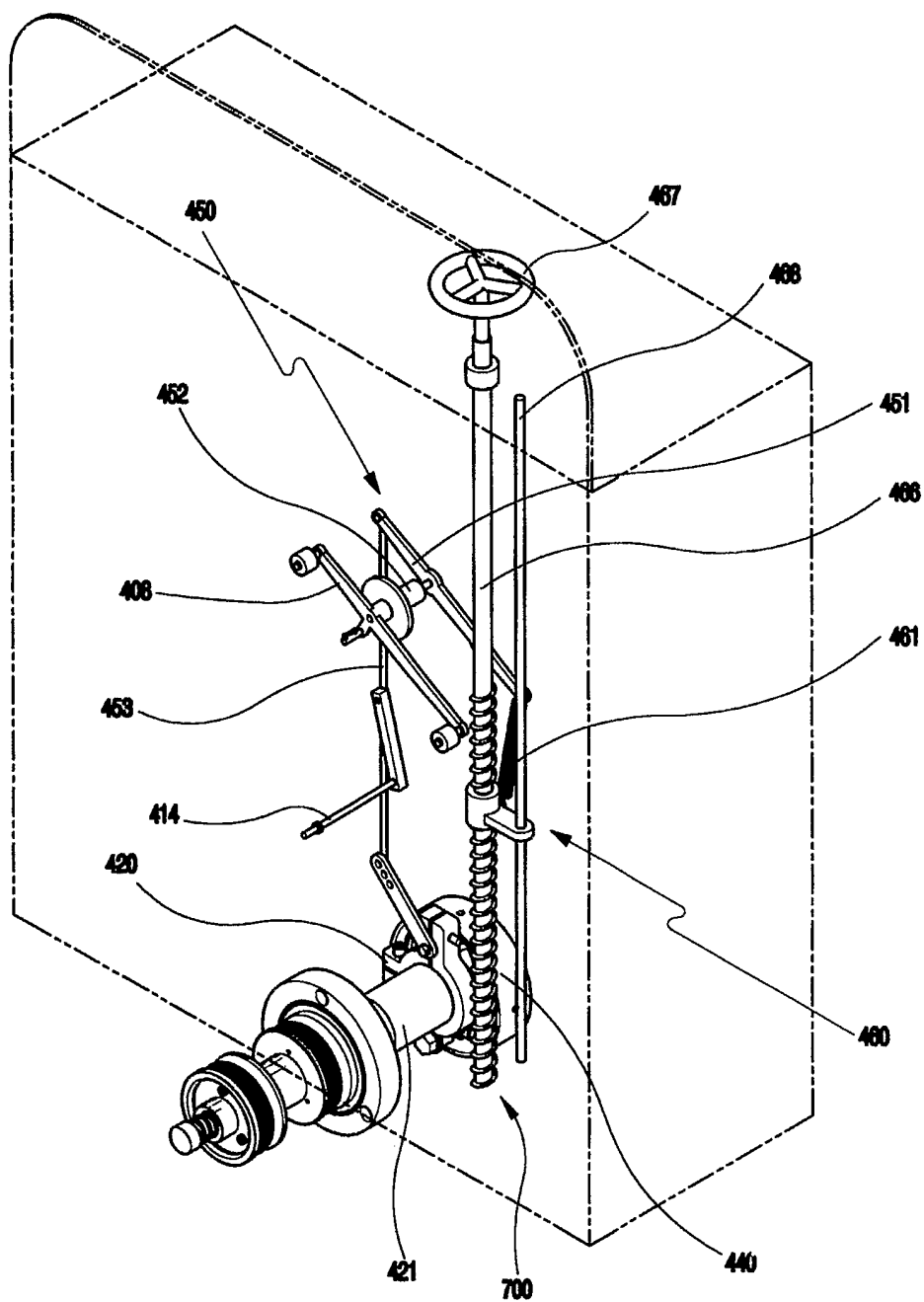


Fig. 11

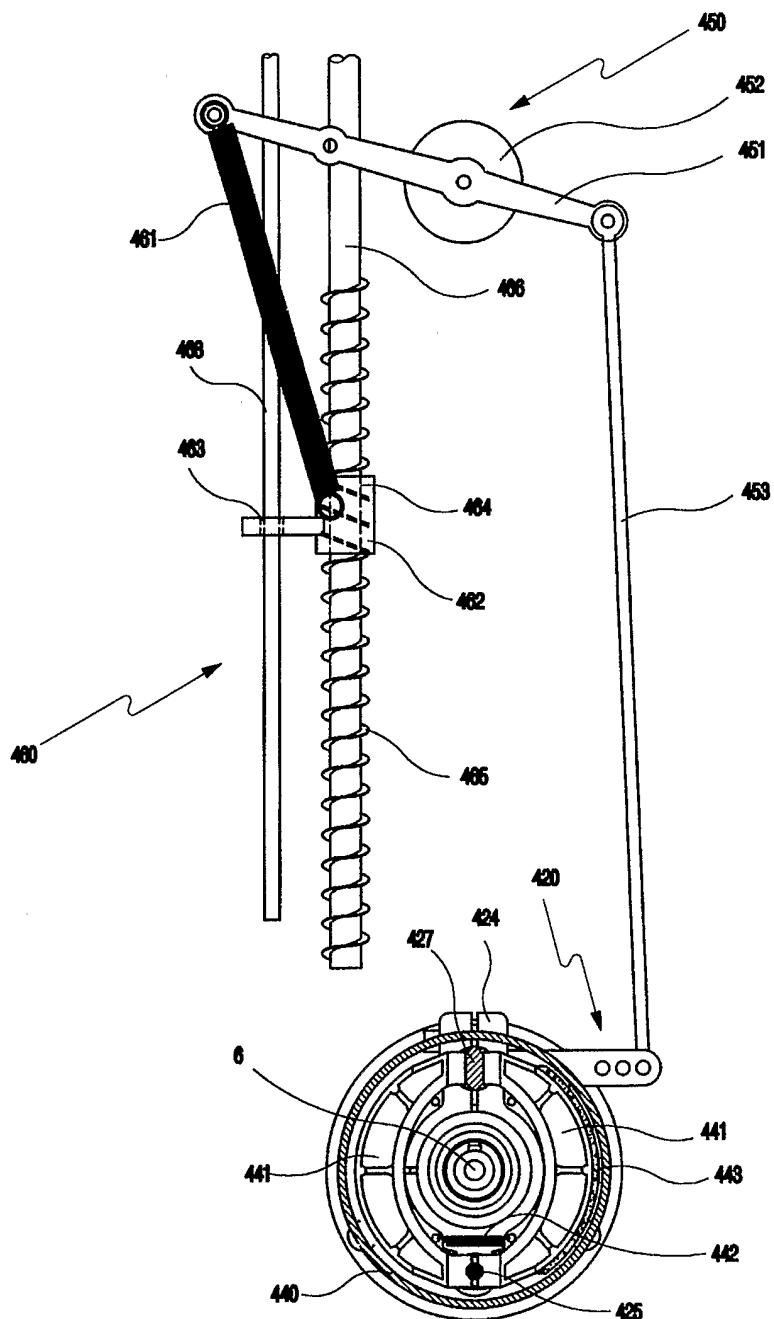
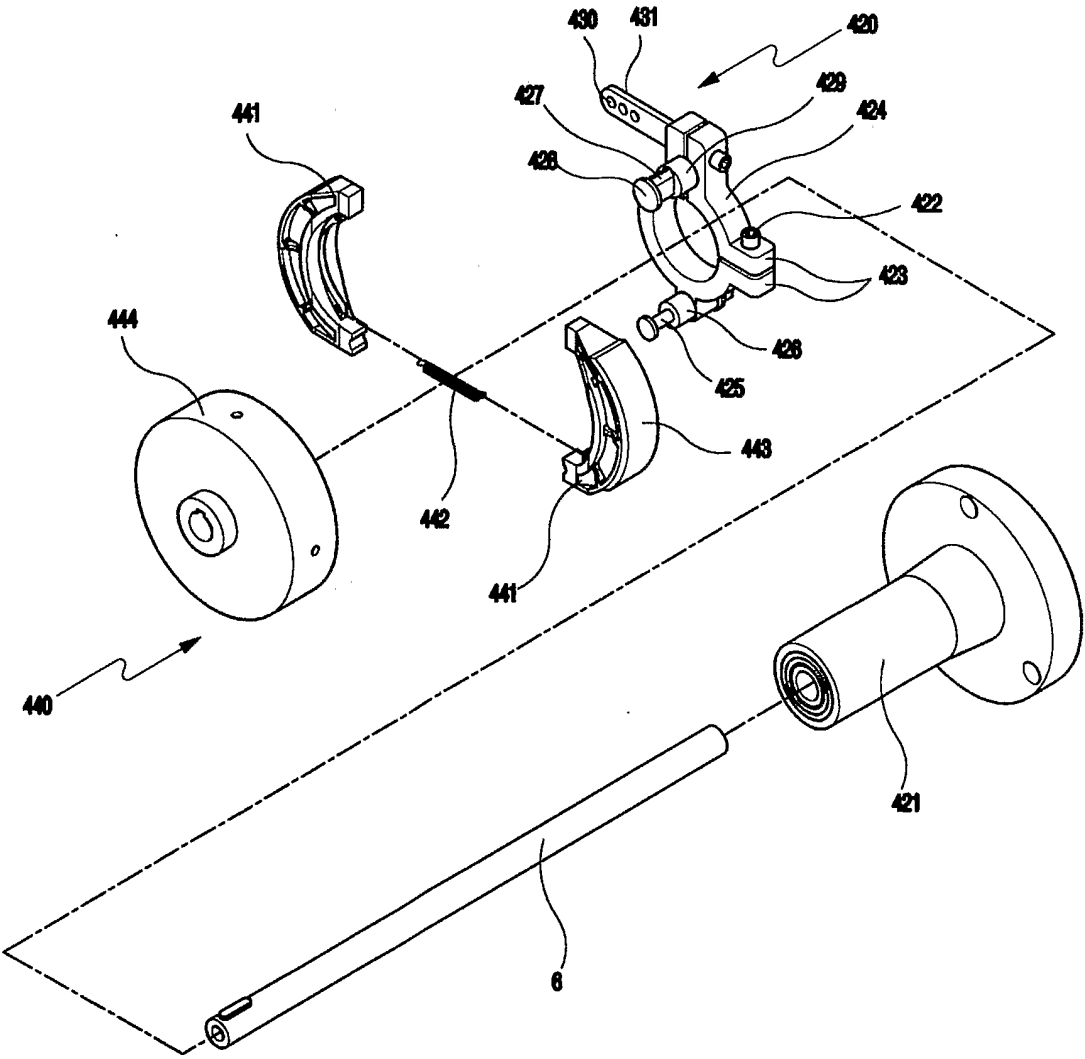
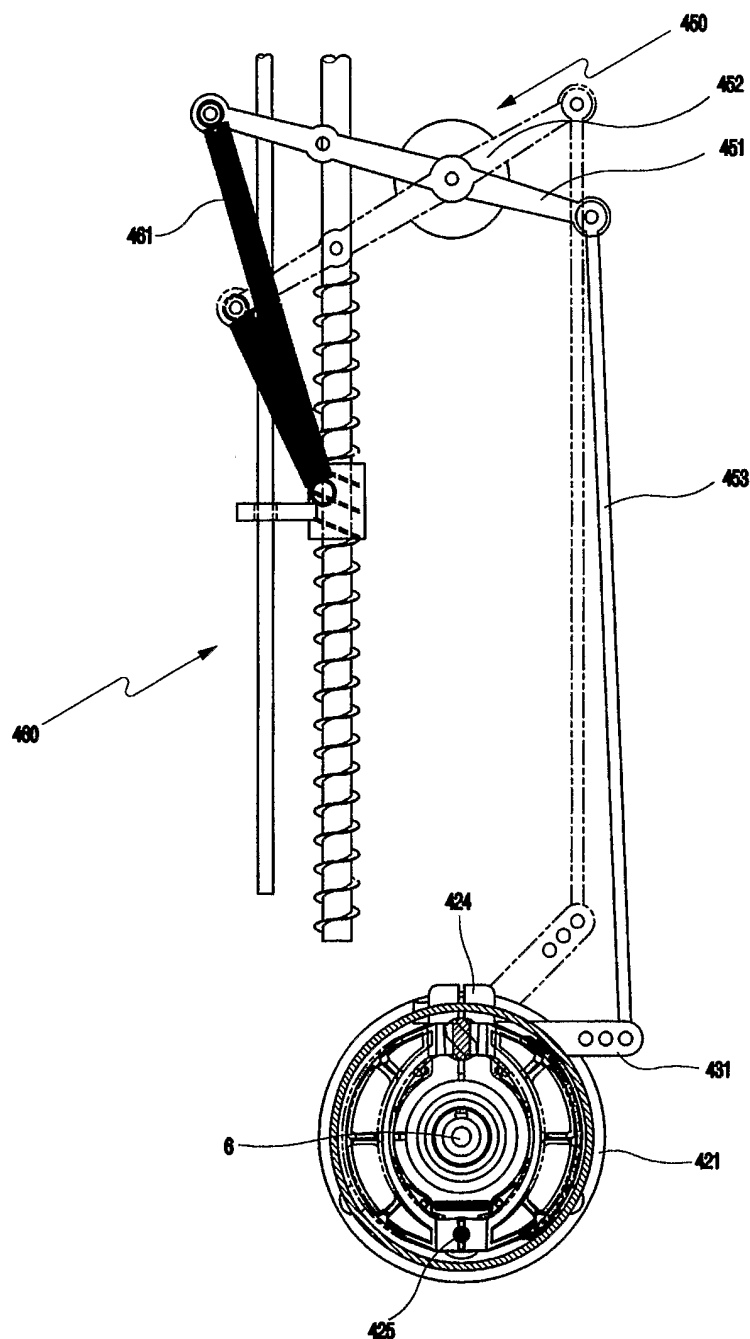


Fig. 12



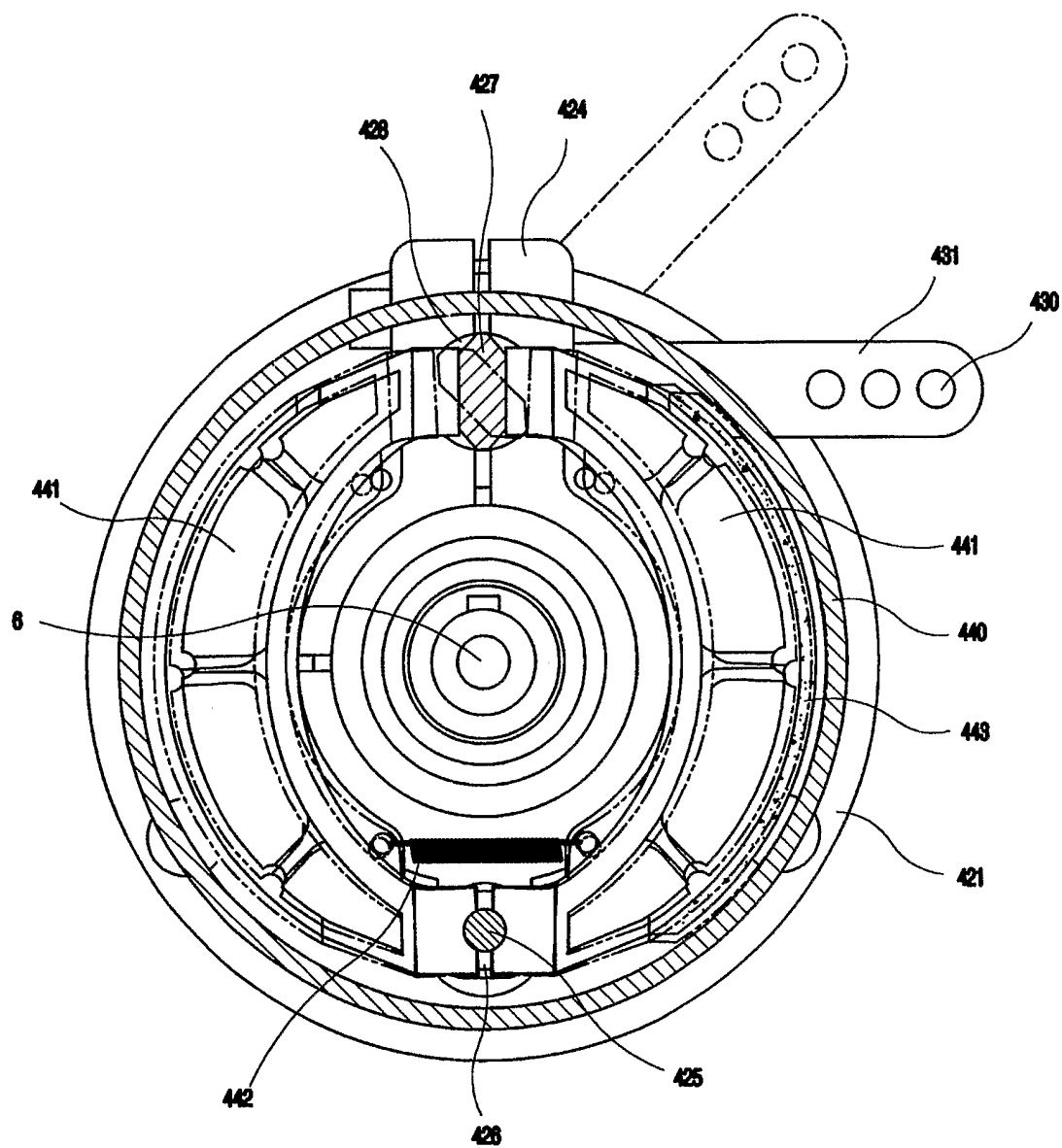
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Fig. 13



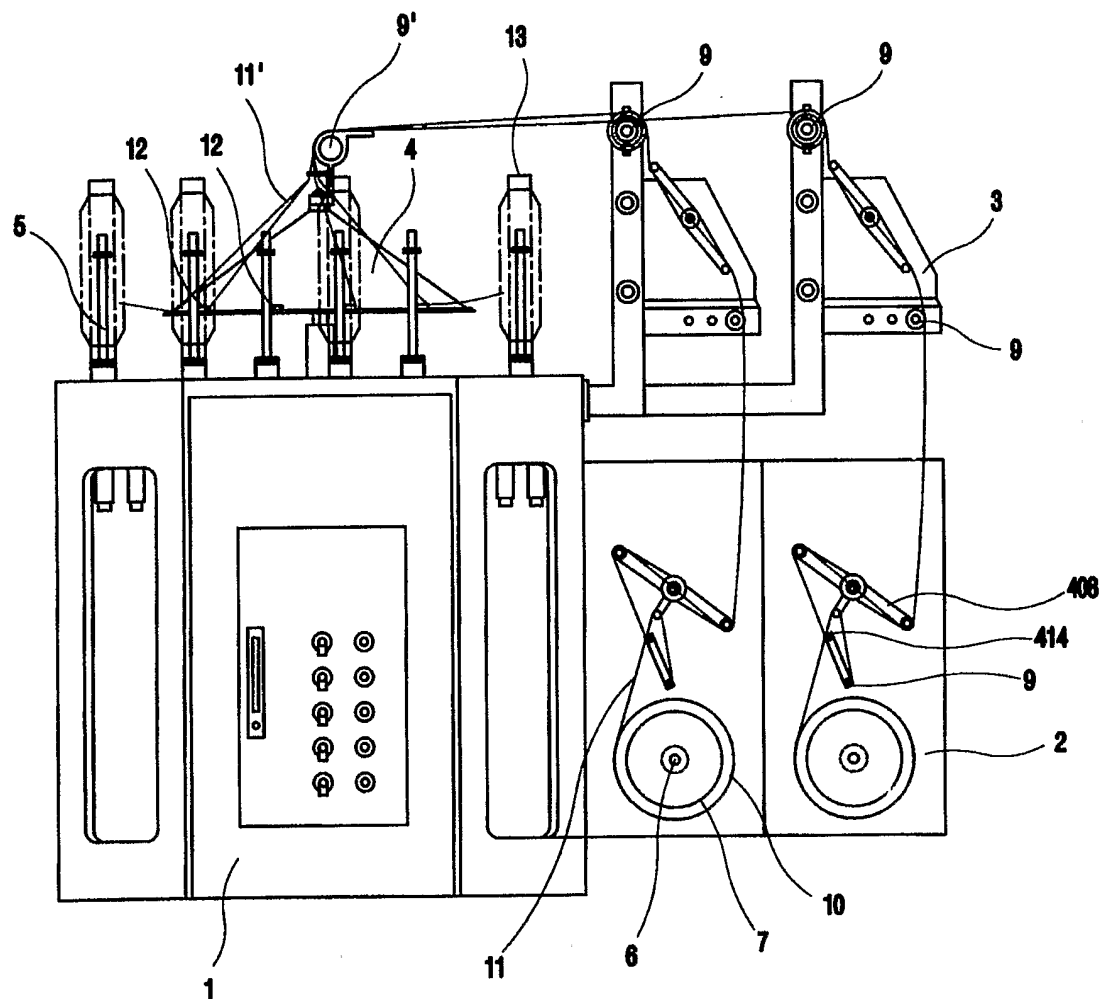
14/19

Fig. 14



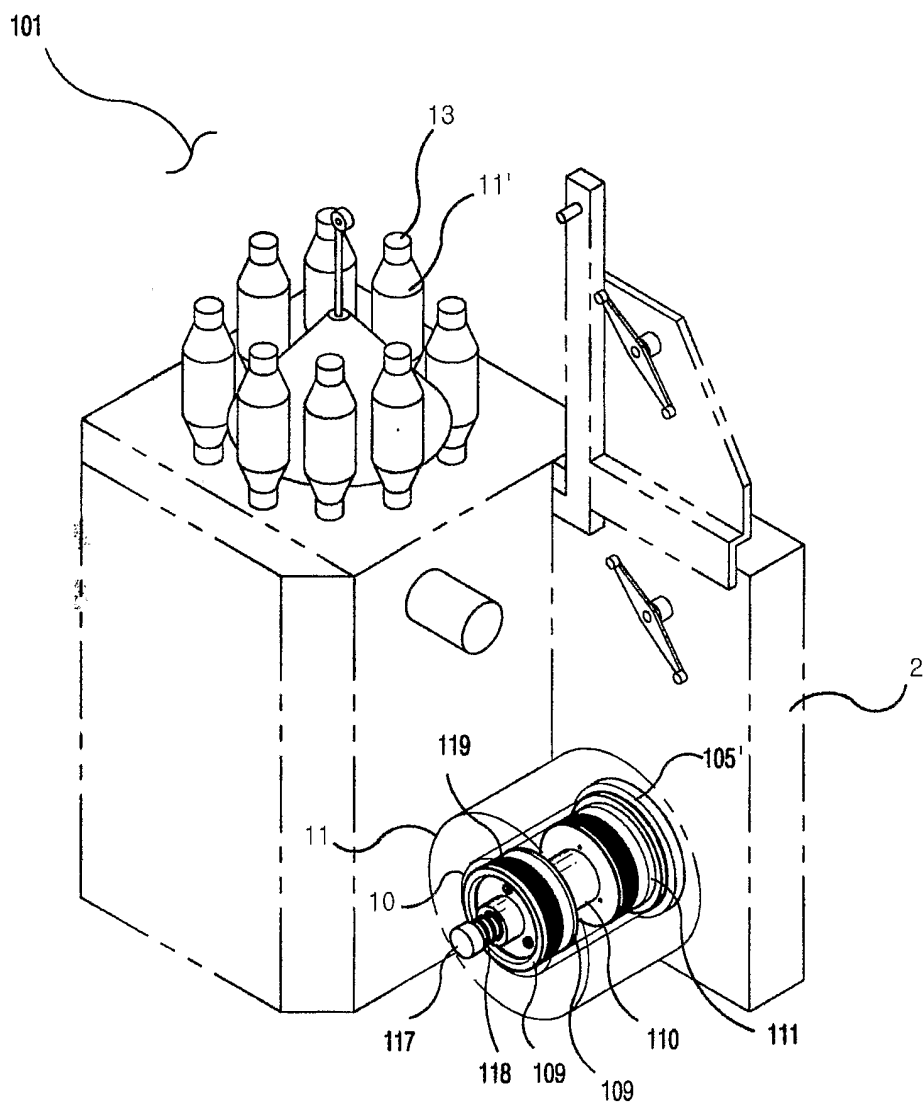
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Fig. 15



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Fig. 16



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Fig. 17

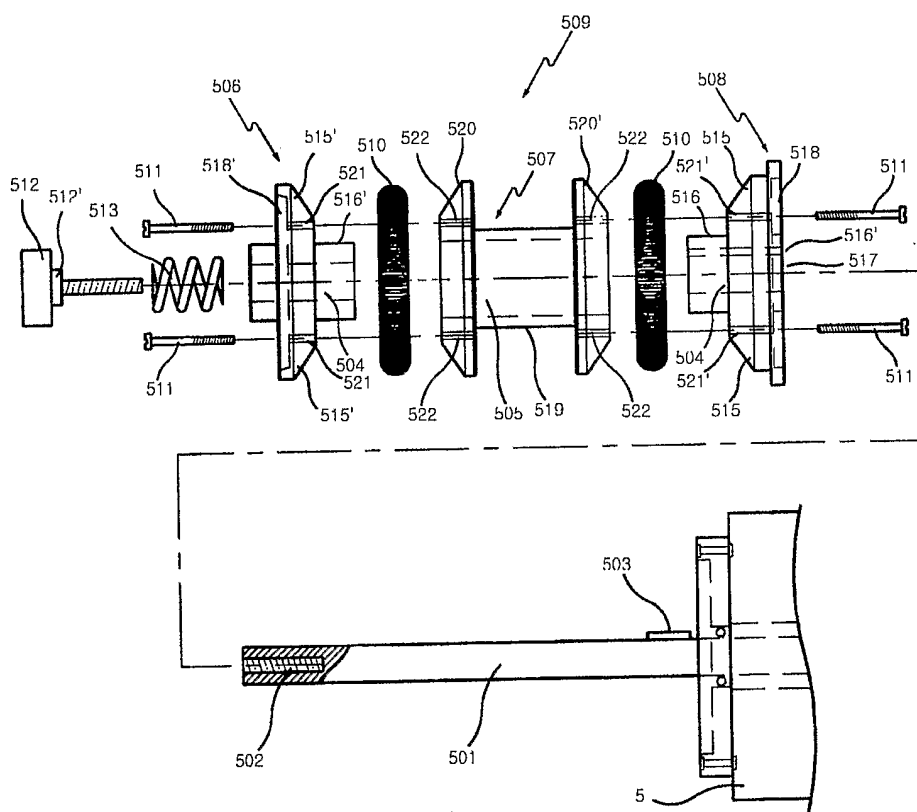
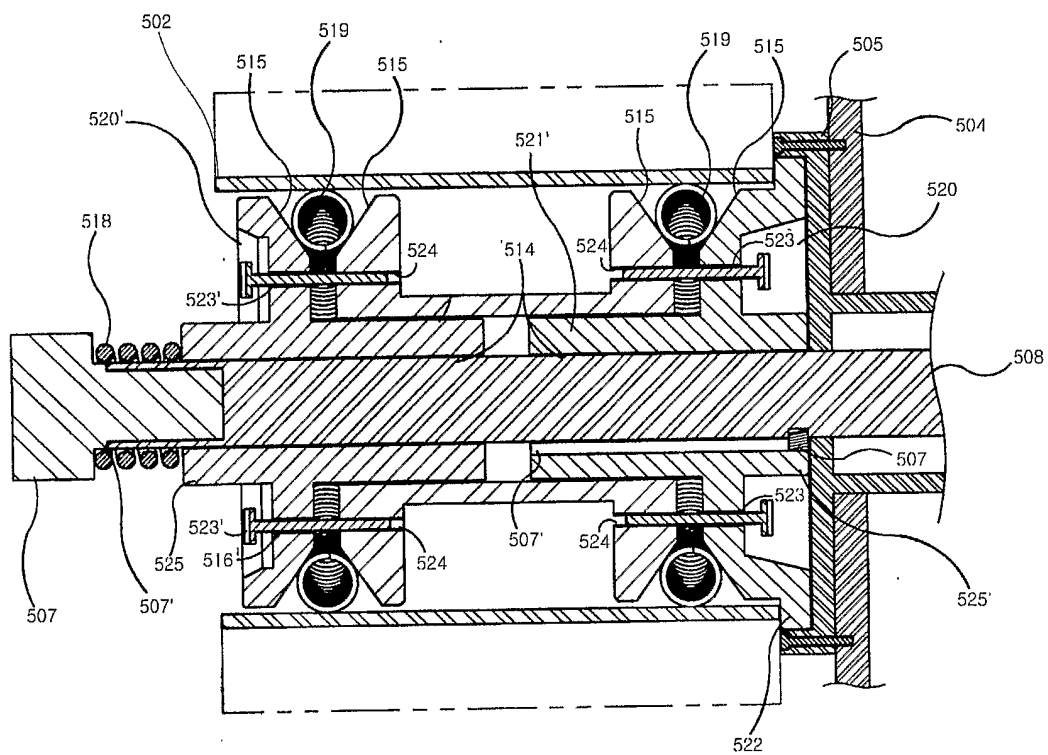


Fig. 19



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR02/01335

A. CLASSIFICATION OF SUBJECT MATTER**IPC7 D02H 13/00**

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7 D02H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
KR IPC AS ABOVE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6,270,033 B1 (SCHLAFHORST & CO) 07 AUGUST 2001 See the whole document	1-6
A	EP 0012235 A1 (HACOBAS TEXTILMASCHINEN) 25 JUNE 1980 See the whole document	1
A	US 4830296 A (MURATA MACHINERY LTD) 16 MAY 1989 See the whole document	1
A	EP 1127833 A2 (MURATA MACHINERY LTD) 29 AUGUST 2001 See the whole document	1
A	KR 2000-54245 A (BACK) 05 SEPTEMBER 2000 See the whole document	1-6
A	KR 91-4356 U (JEON) 18 MARCH 1991 See the whole document	1

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search

16 OCTOBER 2002 (16.10.2002)

Date of mailing of the international search report

17 OCTOBER 2002 (17.10.2002)

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Korean Intellectual Property Office
920 Dunsan-dong, Seo-gu, Daejeon 302-701,
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Authorized officer

CHO, Sung Ho

Telephone No. 82-42-481-5615



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR02/01335

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KR 91-4356 U	18-03-1991	NONE	