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

(11) **EP 4 170 077 A1**

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
26.04.2023 Bulletin 2023/17

(21) Application number: **21213385.4**

(22) Date of filing: **09.12.2021**

(51) International Patent Classification (IPC):
D02G 3/12 *(2006.01)* ***D02G 3/28*** *(2006.01)*
D02G 3/44 *(2006.01)*

(52) Cooperative Patent Classification (CPC):
D02G 3/449; D02G 3/12; D02G 3/283; D02G 3/441;
D10B 2101/20; D10B 2201/02

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(30) Priority: **25.10.2021 CN 202111239919**

(71) Applicant: **Shandong Jinsi New Material Technology Co., Ltd.**
Dezhou City
Shandong 253000 (CN)

(72) Inventor: **Min, Qing fu**
Feicheng Town, 273400 (CN)

(74) Representative: **Sánchez Margareto, Carolina**
C/ Almirante Cadaros 26, bajo
46005 Valencia (ES)

(54) ALLOY FILAMENT AND SIMPLE YARN BLENDING EQUIPMENT AND PROCESS

(57) The present disclosure discloses alloy filament and simple yarn blending equipment and a process, and belongs to the technical field of textiles. The equipment comprises a machine head, a machine body, a machine tail, and a computer control box arranged on one side of the machine head; and an upper roller, a first covering spindle, a second covering spindle, a heat setting box, a lower roller, and a winding device are sequentially arranged in the machine body from top to bottom. The equipment is technically modified through the solution to achieve completion of the procedures such as covering, twisting, spooling and the like of the yarn on one piece of equipment, the yarn is integrally formed, the process is the first in China, and is equivalent to a chip in the spinning industry, the labor as well as time and energy are saved, and economic efficiency is greatly improved.

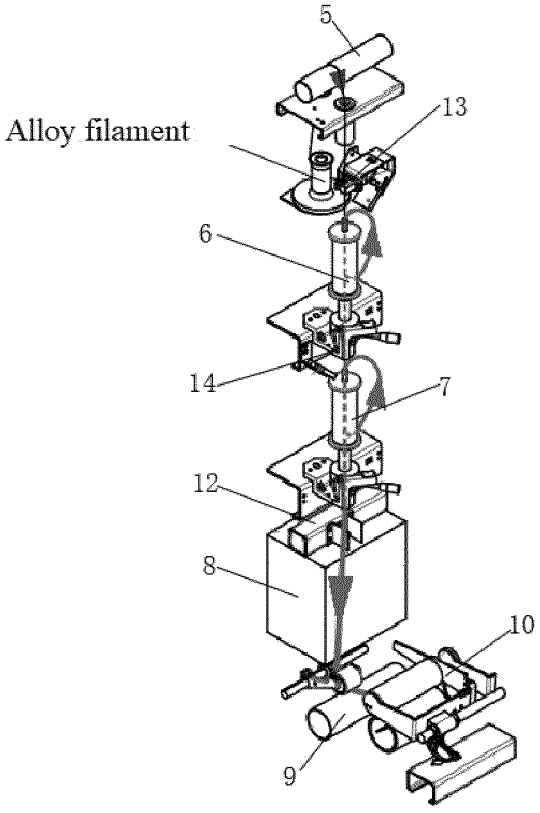

FIG.2

EP 4 170 077 A1

Description

TECHNICAL FIELD

[0001] The present disclosure relates to the technical field of textiles, more specifically, relates to alloy filament and simple yarn blending equipment and process.

BACKGROUND ART

[0002] At present, no example of applying metal filaments to textiles exists at home and abroad, and no metal nano coating for spinning is antibacterial, antistatic and the like. Due to various disadvantages, such as: difficult to remove after accidentally entering the human body, threatening human health, easy to cause pollution to the environment, and the like, the nano coating is difficult to be used for making clothes for daily wear.

[0003] At present, the process flow of yarn composite blending core covering at home and abroad is complex, time-consuming, and energy-consuming, all machines are relatively simplified, for example, in an operation of combining two strands of yarns together in yarn compounding, doubling needs to be conducted through a doubling machine firstly, then the doubled yarn is taken to a twisting machine to be twisted, and then the twisted yarn is spooled on a spooling machine to form the yarn. The machine adopted in this way is numerous in process and complex in procedure, which causes great waste in terms of time and efficiency.

[0004] No example of applying metal filaments to textiles exists at home and abroad, and due to the fact that particles are particularly fine, mobility of the metal nano coating for textiles is particularly high, the metal nano coating is prone to being sucked into a human body, even can penetrate through blood brain barrier after entering human body and can be gathered in organs due to the fact that the metal nano coating is hard to degrade; the defects are difficult to avoid due to physical properties of nanomaterials themselves; and, secondly, the nanomaterials are high in cost and difficult to process.

SUMMARY

[0005] For the problem existing in the prior art, an objective of the present disclosure is to provide alloy filament and simple yarn blending equipment and process to solve the problem.

[0006] To achieve the objective, the following technical solution is adopted by the present disclosure.

[0007] The alloy filament and simple yarn blending equipment and the process are provided, the equipment comprises a machine head, a machine body, a machine tail, and a computer control box arranged at one side of the machine head; an upper roller, a first covering spindle, a second covering spindle, a heat setting box, a lower roller, and a winding device are sequentially arranged in the machine body from top to bottom.

[0008] As further description of the technical solution, a waste gas treatment exhaust fan is arranged at the top of the machine head, and a waste gas exhaust duct is communicated between the heat setting box and the waste gas treatment exhaust fan.

[0009] As further description of the technical solution, an alloy filament break alarm corresponding to the alloy filament and a covered yarn break alarm corresponding to a covered yarn are arranged in the machine body.

[0010] Another technical problem needing to be solved by the present disclosure is to provide an alloy filament and simple yarn blending process, comprising the following steps:

one, material preparation: preparing raw materials of a simple yarn;
two, fore-spinning: making raw materials of the simple yarn into a well-formed drawn sliver in the fore-spinning stage, and regularly putting the drawn sliver in a spinning machine in a coiled manner;
three, post-spinning: enabling the drawn silver to form into spun yarn with a certain twist and strength in the post-spinning stage, winding the spun yarn on a bobbin to serve as a covered yarn for standby application;
four, selecting an alloy filament, and uniformly winding the alloy filament on a bobbin for standby application;
five, placing two reels of covering threads on the first covering spindle and the second covering spindle, feeding the alloy filament and the covering threads into the upper roller, pulling the alloy filament and the covering threads through the lower roller, taking the alloy filament as a core wire, covering and twisting the alloy filament by using the covering threads, wherein the breaking conditions of the alloy filament and the covered yarn are monitored in real time by the alloy filament break alarm and the covered yarn break alarm, and an alarm is given when the breaking occurs, thus reminding workers to handle timely; and
six, conducting heat setting through a heat setting box on the blending equipment after covering is completed, and finally winding through a winding device.

[0011] As the further description of the technical solution, the fore-spinning stage comprises the following steps:

(1) compressing: extruding the raw materials by an extruder to facilitate mixing;
(2) removing impurities: removing most impurities, defects, and fibrils unsuitable for spinning from the raw materials,
(3) lap forming of the yarn;
(4) combing;
and (5) drawing.

[0012] As further description of the technical solution,

the drawing comprises the following steps:

a, combining 6-8 cotton slivers to improve the length unevenness of the cotton slivers;
b, elongating and attenuating the cotton slivers to a specified weight, and further improving the straightening parallelism degree of the fibers;
c, mixing the cotton slivers on a drawing frame;
and d, making coiled silvers into well-formed drawn slivers, and regularly putting the drawn slivers in a spinning machine in a coiled manner.

[0013] As further description of the technical solution, the post-spinning stage comprises the following steps:

(1) roving: drafting and twisting a drawn sliver combined by drawing to enable the sliver to have a certain strength, thus facilitate winding of the rove and unwinding of the sliver on a spinning frame;
(2) spinning: drafting and attenuating the rove to the required fineness, and twisting to form spun yarn with a certain twist and strength, and winding the spun yarn on the bobbin.

[0014] Compared with the prior art, the present disclosure has the advantages that:

(1) the equipment is technically modified through the solution, an alloy filament is used as a core, various simple yarns are used for conducting primary covering and secondary covering, then setting is conducted, and finally winding and spooling are conducted to form a yarn, the procedures such as covering, twisting, spooling and the like of the yarn is completed on one piece of equipment, the yarn is integrally formed, and the process is the first in China, and is equivalent to a chip in the spinning industry, which can save labor as well as time and energy, and greatly improves economic efficiency;
(2) the antibacterial and static electricity removing functions can be solved by blending the alloy filament and various simple yarns, and the effect same as that of the nano coating can be achieved; the clothes made of the alloy filament blended yarns can permanently remove static electricity and also have the functions of permanently resisting bacteria, removing odor and the like, and the clothes has the advantages of being resistant to washing, free of heavy metal falling, capable of being colored at will and the like; compared with the nano coating, the alloy filament blended fabric overcomes the problem of heavy metal pollution, physical drafting is adopted in the manufacturing process, pollution discharge and smoking are avoided, the environment is completely protected, and the national development trend of energy conservation and emission reduction is responded;
(3) the yarn spun according to the solution can effectively resist can effectively resist coronavirus, H3N2 virus, poliovirus, H1N1 virus, enterovirus 71 type, escherichia coli, staphylococcus aureus, Klebsiella pneumoniae, and candida albicans.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015]

FIG. 1 is a structure diagram of blending equipment of the present disclosure;
FIG. 2 is a partial stereogram of FIG. 1 of the present disclosure.

[0016] Reference numerals in the drawings:
1-machine head, 2-machine body, 3-machine tail, 4-computer control box, 5-upper roller, 6-first covering spindle, 7-second covering spindle, 8-heat setting box, 9-lower roller, 10-winding device, 11-waste gas treatment exhaust fan, 12-waste gas exhaust duct, 13-alloy filament break alarm, 14-covered yarn break alarm.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0017] The technical solutions in the embodiments of the present disclosure are clearly and completely descried below with reference to the accompanying drawings in the embodiments of the present disclosure.
[0018] Please referring to FIG. 1 to 2, alloy filament and simple yarn blending equipment and process are provided, the equipment comprises a machine head 1, a machine body 2, a machine tail 3, and a computer control box 4 arranged at one side of the machine head 1, wherein an upper roller 5, a first covering spindle 6, a second covering spindle 7, a heat setting box 8, a lower roller 9, and a winding device 10 are sequentially arranged in the machine body 2 from top to bottom.
[0019] Wherein a waste gas treatment exhaust fan 11 is arranged at the top of the machine head 1, and a waste gas exhaust pipeline 12 is communicated between the heat setting box 8 and the waste gas treatment exhaust fan 11.
[0020] In addition, an alloy filament break alarm 13 and a covered yarn break alarm 14 are arranged in the machine body 2 for break alarming of the alloy filament or the covered yarn.
[0021] The alloy filament and the simple yarn blending process provided by the solution comprise the following steps:

one, material preparation: preparing raw materials of a simple yarn;
two, fore-spinning: making raw materials of the simple yarn into a well-formed drawn sliver in the fore-spinning stage, and regularly putting the drawn sliver in a spinning machine in a coiled manner;
three, post-spinning: enabling the drawn silver to form into spun yarn with a certain twist and strength

in the post-spinning stage, and winding the spun yarn on a bobbin to serve as a covered yarn for standby application;
four, selecting an alloy filament, and uniformly winding the alloy filament on the bobbin for standby application;
five, placing two reels of covering threads on the first covering spindle 6 and the second covering spindle 7, feeding the alloy filament and the covering threads into the upper roller 5, pulling the alloy filament and the covering threads through the lower roller 9, taking the alloy filament as a core wire, covering and twisting the alloy filament by using the covering threads, wherein the breaking condition of the alloy filament and the covered yarn is monitored in real time by the alloy filament break alarm 13 and the covered yarn break alarm 14, and an alarm is given when the breaking occurs, thus reminding workers to handle timely; and
six, conducting heat setting through a heat setting box 8 on the blending equipment after covering is completed, and finally winding through a winding device 10.

[0022] Specifically, the fore-spinning stage comprises the following steps:

(1) compressing: extruding the raw materials by an extruder to facilitate mixing;
(2) removing impurities: removing most impurities, defects, and fibrils unsuitable for spinning from the raw materials,
(3) lap forming of the yarn;
(4) combing;
and (5) drawing.

[0023] Further, the drawing comprises the following steps:

a, combining 6-8 cotton slivers to improve the length unevenness of the cotton slivers;
b, elongating and attenuating the cotton slivers to a specified weight, and further improving the straightening parallelism degree of the fibers;
c, mixing the cotton slivers on a drawing frame;
and d, making coiled silvers into well-formed drawn slivers, and regularly putting the drawn slivers in a spinning machine in a coiled manner.

[0024] Specifically, the post-spinning stage comprises the following steps:

(1) roving: drafting and twisting a drawn sliver combined by drawing to enable the sliver to have a certain strength, thus facilitate winding of the rove and unwinding of the sliver on a spinning frame;
(2) spinning: drafting and attenuating the rove to the required fineness, and twisting to form spun yarn with a certain twist and strength, and winding the spun yarn on the bobbin.

[0025] The technical solution has the effects that: the overall integration density is high, labor and energy are saved, physical drafting is adopted in the production process, pollution discharge and smoking are both avoided, the environment is completely protected, and the national development trend of energy conservation and emission reduction is responded; and the yarn spun by the solution can effectively resist coronavirus, H3N2 virus, poliovirus, H1N1 virus, enterovirus 71 type, escherichia coli, staphylococcus aureus, Klebsiella pneumoniae, and candida albicans.

[0026] The above is only a preferred specific embodiment of the present disclosure; however, the scope of protection of the present disclosure is not limited thereto. Equivalent replacements or changes made by any person skilled in the art of the present disclosure, within the technical scope disclosed by the present invention, based on the technical solutions of the present disclosure improved concept thereof shall be encompassed in the scope of protection of the present disclosure.

Claims

1. Alloy filament and simple yarn blending equipment and process, the equipment comprising a machine head (1), a machine body (2), a machine tail (3), and a computer control box (4) arranged at one side of the machine head (1), wherein an upper roller (5), a first covering spindle (6), a second covering spindle (7), a heat setting box (8), a lower roller (9), and a winding device (10) are sequentially arranged in the machine body (2) from top to bottom;

   a waste gas treatment exhaust fan (11) is arranged at the top of the machine head (1), and a waste gas exhaust duct (12) is communicated between the heat setting box (8) and the waste gas treatment exhaust fan (11).
   an alloy filament break alarm (13) corresponding to an alloy filament and a covered yarn break alarm (14) corresponding to a covered yarn are arranged in the machine body (2).

2. The alloy filament and simple yarn blending equipment and process according to claim 1, wherein the process comprises the following steps:

   one, material preparation: preparing raw materials of a simple yarn;
   two, fore-spinning: making the raw materials of the simple yarn into a well-formed drawn sliver in the fore-spinning stage, and regularly putting the drawn sliver in a spinning machine in a coiled manner;

three, post-spinning: enabling the drawn silver to form into spun yarn with a certain twist and strength in the post-spinning stage, winding the spun yarn on a bobbin to serve as a covered yarn for standby application;
four, selecting an alloy filament, and uniformly winding the alloy filament on a bobbin for standby application;
five, placing two reels of covering threads on the first covering spindle (6) and the second covering spindle (7), feeding the alloy filament and the covering threads into the upper roller (5), pulling the alloy filament and the covering threads by the lower roller (9), taking the alloy filament as a core wire, covering and twisting the alloy filament by using the covering threads, wherein breaking conditions of the alloy filament and the covered yarn are monitored in real time by the alloy filament break alarm (13) and the covered yarn break alarm (14), and an alarm is given when the breaking occurs, thus reminding workers to handle timely; and
six, conducting heat setting through a heat setting box (8) on the blending equipment after covering is completed, and finally winding through a winding device (10).

3. The alloy filament and simple yarn blending equipment and process according to claim 2, wherein the fore-spinning stage comprises the following steps:

(1) compressing: extruding the raw materials by an extruder to facilitate mixing;
(2) impurity removal: removing most impurities, defects, and fibrils unsuitable for spinning from the raw materials,
(3) lap forming of the yarns;
(4) combing;
and (5) drawing;
the post-spinning stage comprises the following steps:

(1) roving: drafting and twisting a drawn sliver combined by drawing to enable the sliver to have a certain strength, thus facilitate winding of the rove and unwinding of the sliver on a spinning frame;
(2) spinning: drafting and attenuating the rove to the required fineness, and twisting to form spun yarn with a certain twist and strength, and winding the spun yarn on the bobbin.

4. The alloy filament and simple yarn blending equipment and process according to claim 3, wherein the drawing comprises the following steps:

a, combining 6-8 cotton slivers to improve the length unevenness of the cotton slivers;
b, elongating and attenuating the cotton slivers to a specified weight, and further improving the straightening parallelism degree of the fibers;
c, mixing the cotton slivers on a drawing frame; and d, making coiled silvers into well-formed drawn slivers, and regularly putting the drawn slivers in a spinning machine in a coiled manner.

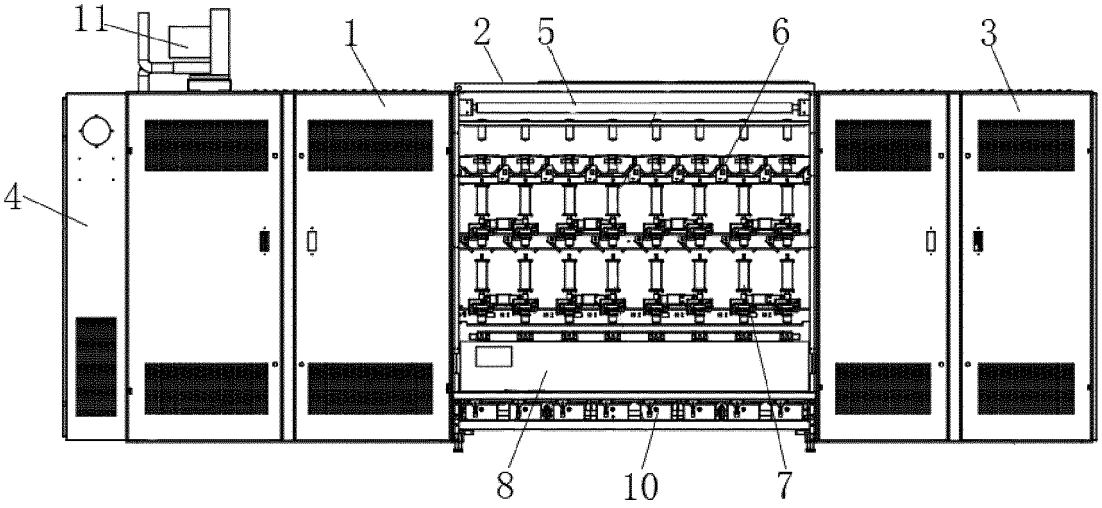

FIG.1

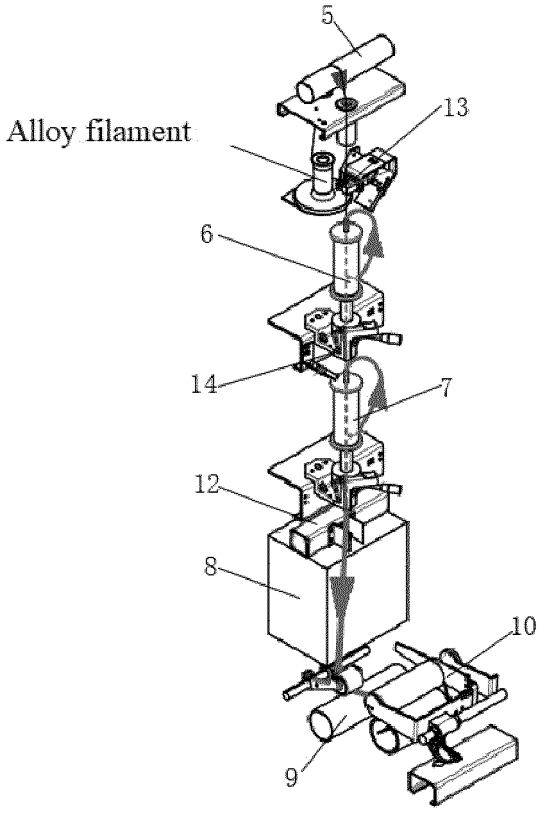

FIG.2

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 21 21 3385

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	KR 2012 0024142 A (KOREA TEXTILE INSPECTION & AMP TESTING INST [KR]) 14 March 2012 (2012-03-14)	1	INV. D02G3/12 D02G3/28
Y	* paragraph [0007] - paragraph [0011] * * paragraph [0017] - paragraph [0023] * * figures 2,3 *	2-4	D02G3/44
Y	KR 101 037 975 B1 (PARK SANG MIN [KR]; JI SANG BIN [KR]) 1 June 2011 (2011-06-01) * paragraph [0010] * * figure 1 *	2-4	
Y	US 6 132 871 A (ANDREWS MARK A [US]) 17 October 2000 (2000-10-17) * the whole document *	2-4	

TECHNICAL FIELDS SEARCHED (IPC)
D02G

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	17 May 2022	Humbert, Thomas

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 21 21 3385

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

17-05-2022

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
KR 20120024142 A	14-03-2012	NONE	
KR 101037975 B1	01-06-2011	NONE	
US 6132871 A	17-10-2000	US 6033779 A	07-03-2000
		US 6132871 A	17-10-2000
		US 6216431 B1	17-04-2001

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82