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(54) **FLOW GUIDING APPARATUS HAVING NOZZLES FOR FABRIC DYEING MACHINE**

(57) The application of the invention is a deflector contain nozzle, including fabric delivery channel. First nozzle is installed in the entrance of the fabric delivery channel; the downstream of the first nozzle is a curved pipe. The bottom of fabric delivery channel connected with the curved pipe which is installed second nozzle. The downstream of the second nozzle included a delivery plate. There is a notch between second nozzle and de-

livery plate. Also, there are two curved side wall on the delivery trough and the mentioned side wall installed on both side of the fabric delivery channel respectively. The mentioned device can enhance the dyeing quality, and avoid the fabric from bundling together. It saves time and human resource applied on fabric unbundling, minimize the cost.

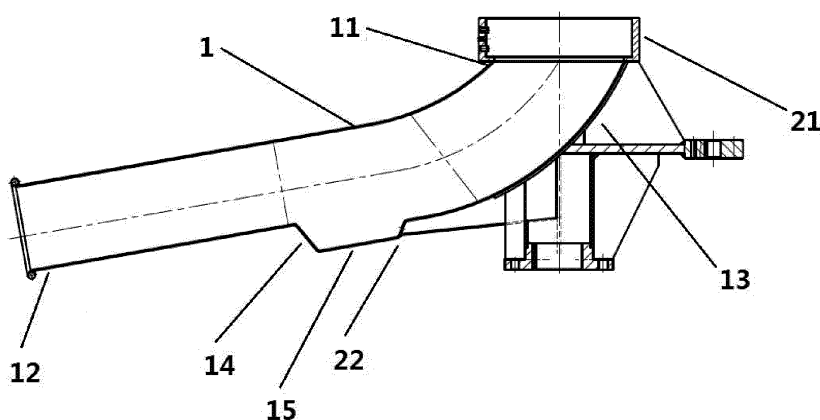


Figure 1

Description

Technical field

[0001] This invention is a type of deflector contain nozzle, an improvement that focus on platter inside the dyeing machine. It is the technical field of dyeing equipment.

Background of the Invention

[0002] High temperature dyeing machine usually included nozzle and fabric storage trough, these structures helps the fabric looping inside the machine continuously. Fabric passes through the nozzle and then directly to fabric storage trough. Usually, dyeing machine can handle a long fabric that is longer than fabric storage trough. The fabric usually piled up inside the fabric storage trough. The stacked fabric is pushed forward by its own weight until the other side of the fabric storage trough. The dyeing solution is then sprayed on the fabric for a new cycle. However, the fabrics have not placed orderly in the fabric storage trough cause low efficiency using the space of the fabric storage trough. Thus, the later version of the dyeing machine included an extra single axis platter device to enhance the efficiency of the fabric storage trough.

[0003] The position of the platter typically placed in the exit of the delivery channel, and keeps swiping during the dyeing process. Fabric first passes through a poly-directional spraying nozzle, and then fabric delivery channel. Fabric falls on the moving part of the platter by the effect of gravitation when fabric comes out from fabric delivery channel. All the fabric is then fall into the fabric storage trough by the movement of the platter. By this special movement, all fabrics fall down evenly, enhance the dyeing process. However, the mentioned system has disadvantages. Firstly, the continuous movement causes the bad dyeing performance. This is because the creases keep constant in the whole dyeing process especially for the tight structure and heavy fabrics. The contact area of dyeing solution on creases and non-creases has different diffuse efficiency. So the color on the fabric might not be even. One of the solutions is using the turbulence induced by the dyeing solution to influence the regular movement of the fabric inside the machine. The disadvantage is the dyeing solution has to increase. This causes the problem of increase in liquor-ratio and energy usage.

Disclosure of the Invention

[0004] The objective of this invention is to improve the recent design of the deflector. It is a deflector with nozzles, using high speed water flow to expand the fabric during dyeing process. Also it could let the fabric loop smoothly inside the machine. This invention will replace the traditional platter that the whole fabric delivery channel could swipe left to right. It is called single axis platter

effect.

[0005] Generally, it is a deflector included nozzle use in dyeing machine. The structure included delivery channel, first nozzle is set up in the entrance of the delivery channel. Downstream of the first nozzle is connected with curved path. At the end of the curved path is connected with second nozzle. Next to the second nozzle, it is a delivery plate placed in the bottom of the fabric delivery channel. Also, there is a flute between second nozzle and bottom of the delivery channel.

[0006] Furthermore, the mentioned fabric dyeing machine contains a nozzle installed deflector. In the mid-way of the deliver channel, there is a delivery flute. It contains a two section curved side walls, the mentioned side wall set up on both side of the delivery channel.

[0007] Furthermore, the mentioned delivery flute is placed between first nozzle and delivery plate.

[0008] The purpose of this design is to produce a turbulence to expand the fabrics. Water ejected from second nozzle flow through delivery plate. The water reflected and hit the bottom of the fabric. It produces a force to expand the fabrics. Also the water flow from delivery flute reflect the high speed water flow from two sides, causes the turbulence, enhance the expanded effect on the fabrics.

[0009] Moreover, the mentioned second nozzle

[0010] Furthermore, the outlet direction of the mentioned second nozzle is faced obliquely upward. The incline plane of the delivery plate is facing to second nozzle. Furthermore, the mentioned second nozzle is combined of single or several nozzle head.

[0011] Furthermore, the outlet of the mentioned first nozzle is smaller than 180 degree.

[0012] Furthermore, the mentioned first nozzle is cone shape. The nozzle can be separate into inner cone and outer cone. There is a adjustable gap between two cones. The volume and velocity of the flow can be adjusted by the size of gap.

[0013] Furthermore, the gap of the mentioned cone shape nozzle, have the curve smaller than 180 degree when the gap is switched on.

[0014] Furthermore, the curved path is smaller or equal than 90 degree.

[0015] Furthermore, the mentioned deflector contains a rotating shaft connected with fabric delivery channel by a connector. The mentioned shaft is rotated by an actuator and causes the swiping motion to the fabric delivery channel.

[0016] The application of this invention improved as below:

1. The cone shape 360 degree spraying nozzle will change to 180 degree. The changes can minimize the water usage and also prevent the fabric from over-pressured; also the fabrics follow the water flow and gravitational forces passes through a 90 degree bended pipe and then reach the fabric delivery channel.

2. The fabric delivery channel is placed horizontally and contains nozzle, delivery plate and rugby-shaped deflector. There is also a nozzle and delivery plate installed in the bottom of the fabric delivery channel that reflects the water bottom up to reach the bottom of the fabric. Moreover, the rugby-shaped deflector reflected the high speed water from both side to produce turbulence.

[0017] The application of the mentioned invention could reduce the crease on fabrics, improve the dyeing performance and also avoid tie up the fabric together. Minimize the time and human power.

Description of the drawings

[0018]

Figure 1 shows the side view of the deflector contain nozzle apply in fabric dyeing machine
 Figure 2 shows the top view of the deflector contain nozzle apply in fabric dyeing machine
 Figure 3 shows the structure of the deflector, Thereinto, 1- fabric delivery channel, 11- entrance, 12- exit, 13- bended section, 14-delivery plate, 15- notch, 21-first nozzle, 22-second nozzle, 3-delivery trough, 4-shaft ,41-connector, 42- water supply of second nozzle

Embodiments of the Invention

[0019] The below figures and examples describe this deflector system including device used and methodology. It should be noted that this patent is not bounded by or limited to this description in any way.

[0020] The deflector in figure 1-3, included fabric delivery channel 1, entrance 11 and exit 12 are placed on two end of the fabric delivery channel, entrance 11 connected with lifting roller, fabric pass through the lifting roller to the first nozzle 21, the main functions of this nozzle are dyeing and providing energy for fabric movement. When the fabric passes through the nozzle, the contact with dyeing solution cause the water content in the fabric increase and become heavier. Thus, the fabric passes through a bended section 13 to reach the horizontal tube. This tube included rugby-shaped delivery channel 3, also second nozzle 22 and delivery plate 14 are placed in the bottom. Second nozzle 22 is connected to the water supply 42, also there is a notch 15 between the second nozzle 22 and delivery plate 14. This combination can reflect the dyeing solution from horizontal to vertical direction.

[0021] With the help of high volume turbulence flow from rugby-shaped deflector, the fabrics are expanded efficiently. This provides the fabric a smooth looping inside the dyeing machine. After that, the fabric comes out from fabric delivery channel 12. The fabric delivery channel 12 swipe left and right continuously. The fabric is

stacked regularly on the fabric storage trough. The space of the storage trough can be used effectively. The movement of the fabric delivery channel can be achieved by shaft 4. The connection of fabric delivery channel and shaft can be achieved by connector 41. The fabric are pushed forward by its own weight to the end of fabric storage trough. Finally, the fabric is lifted up by the lifting roller and the dyeing cycle start again.

[0022] For this application, the outlet of the first nozzle 21 are single direction, this prevent the fabric from bundling together. However, the gap has not been totally sealed to avoid the dyeing result. The bending section 13 included second nozzle 22, delivery plate 14 and a rugby-shaped delivery trough 3, delivery plate 14 is installed in the downstream of the second nozzle 22, the high speed water flow hit the delivery plate 14, the designed angle causes the production of turbulence. The turbulence also produced from rugby-shaped delivery plate 3. When turbulence combined together, the maximum turbulence region so called de-bundling region, fabric expanded to change the folding pattern.

[0023] To concluded, the content and the figures mentioned above are not the limitation to the application. Every product with similar or same principle, included the size, shape and material using, is protected by the application of this patent.

Claims

1. A deflector containing nozzle inside the dyeing machine, **characterized in that:**

includes delivery channel, and first nozzle is set up in the entrance of the delivery channel, and downstream of the first nozzle is connected with curved path, and at the end of the curved path is connected with second nozzle, and next to the second nozzle, it is a delivery plate placed in the bottom of the fabric delivery channel, and there is a flute between second nozzle and bottom of the delivery channel.

2. A deflector containing nozzle inside the dyeing machine according to claim 1, **characterized in that:** the mentioned fabric dyeing machine contains a nozzle installed deflector, and in the mid-way of the deliver channel, there is a delivery flute, and it contains a two section curved side walls, the mentioned side wall set upon both side of the delivery channel.

3. A deflector containing nozzle inside the dyeing machine according to claim 2, **characterized in that:** the mentioned delivery flute is placed between first nozzle and delivery plate.

4. A deflector containing nozzle inside the dyeing ma-

chine according to any one of the claim 1 to 3, **characterized in that:** the outlet direction of the mentioned second nozzle is faced obliquely upward, and the incline plane of the delivery plate is facing to second nozzle.

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5. A deflector containing nozzle inside the dyeing machine according to any one of the claim 1 to 3, **characterized in that:** the mentioned second nozzle is combined of single or several nozzle head. 10
6. A deflector containing nozzle inside the dyeing machine according to any one of the claim 1 to 3, **characterized in that:** the outlet of the mentioned first nozzle is smaller than 180 degree. 15
7. A deflector containing nozzle inside the dyeing machine according to any one of the claim 1 to 3, **characterized in that:** the mentioned first nozzle is cone shape. The nozzle can be separate into inner cone and outer cone. There is a adjustable gap between two cones. The volume and velocity of the flow can be adjusted by the size of gap. 20
8. A deflector containing nozzle inside the dyeing machine according to any one of the claim 7, **characterized in that:** the gap of the mentioned cone shape nozzle, have the curve smaller than 180 degree when the gap is switched on. 25
9. A deflector containing nozzle inside the dyeing machine according to any one of the claim 1 to 3, **characterized in that:** the curved path is smaller or equal than 90 degree. 30

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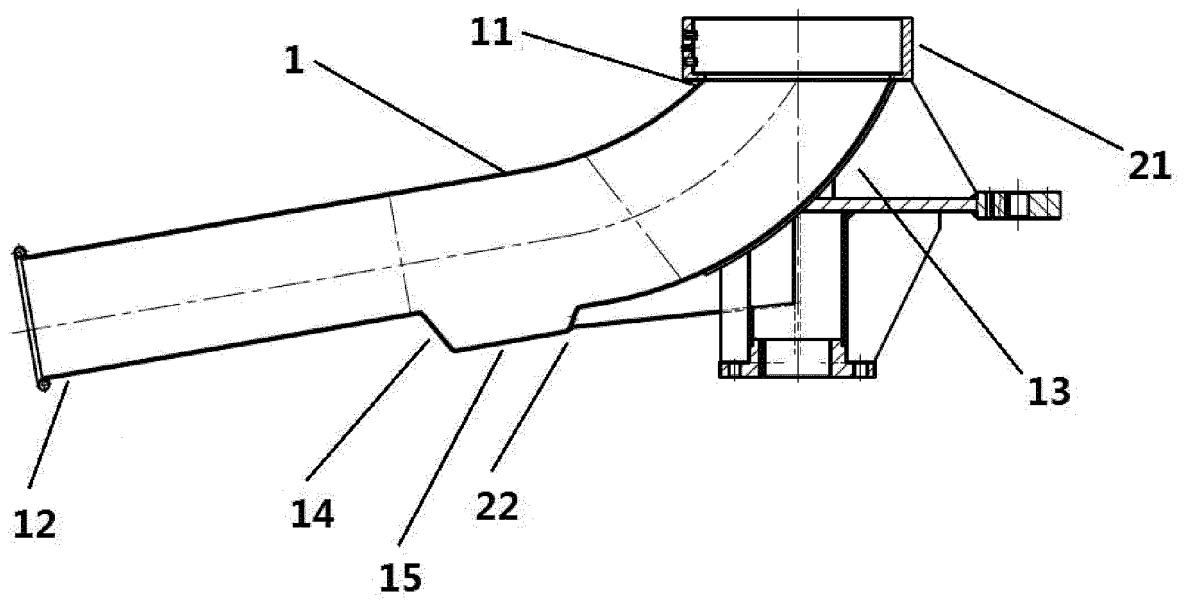


Figure 1

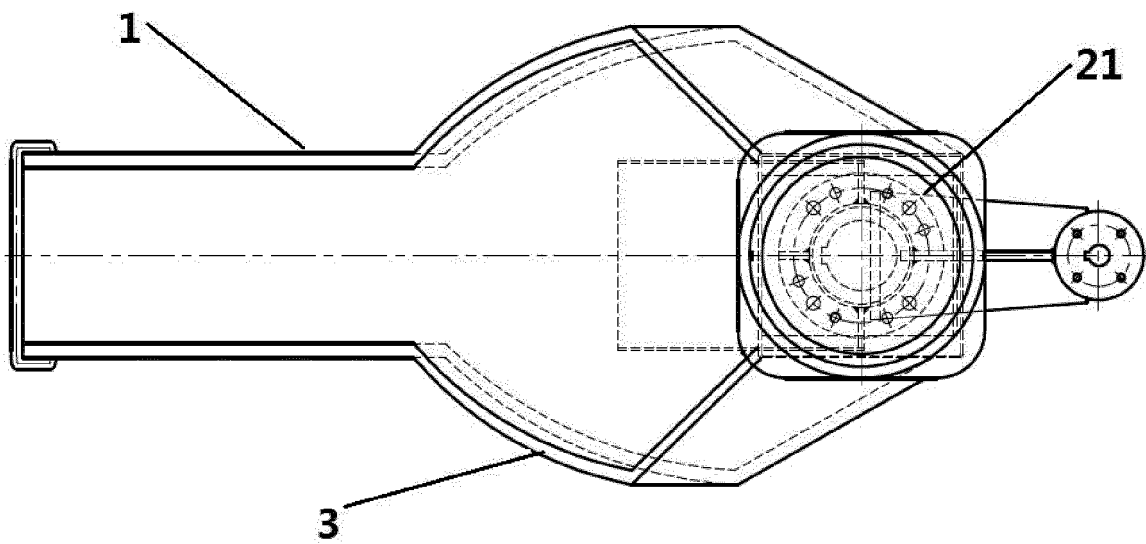


Figure 2

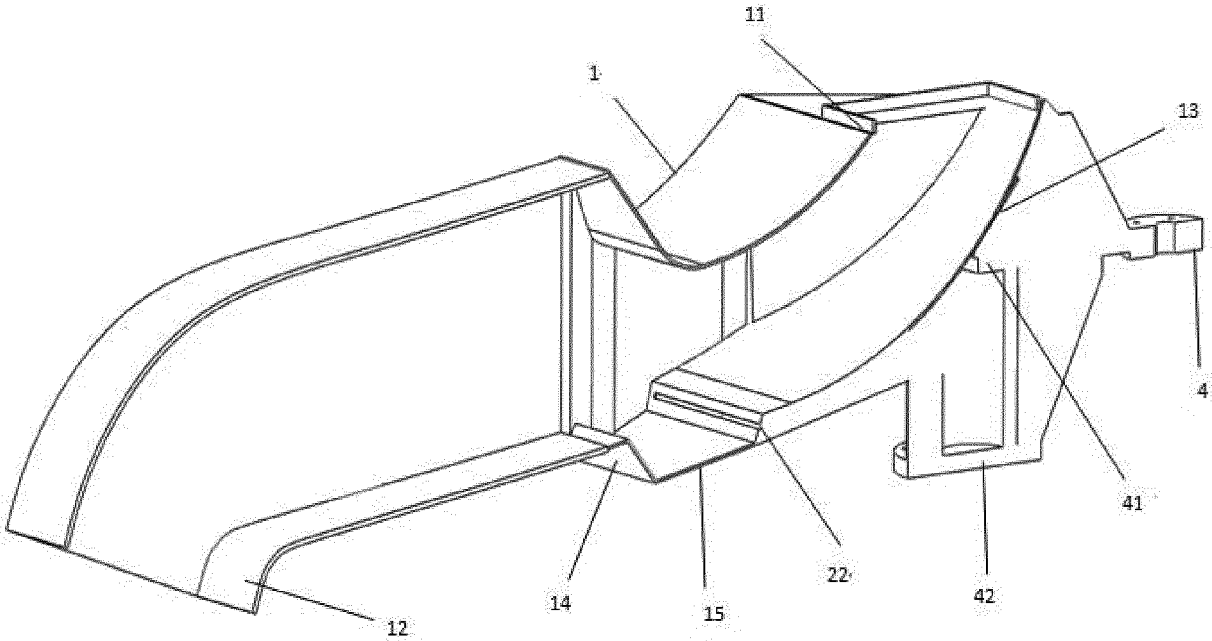


Figure 3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2016/075432

A. CLASSIFICATION OF SUBJECT MATTER

D06B 23/04 (2006.01) i

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)

D06B

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

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

CNABS, CNTXT, CNKI, SIPOABS, DWPI, EPODOC: guide cloth, diversion, bending section, groove, dye+, nozzle?, injector?, muzzle?, spray+, guid+, plate?, board?, arc, arching, curve, camber

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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☐ Further documents are listed in the continuation of Box C.
 ☒ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	
"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	"&" document member of the same patent family

Date of the actual completion of the international search 13 September 2016 (13.09.2016)	Date of mailing of the international search report 29 September 2016 (29.09.2016)
Name and mailing address of the ISA/CN: State Intellectual Property Office of the P. R. China No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088, China Facsimile No.: (86-10) 62019451	Authorized officer SHAO, Suxiu Telephone No.: (86-10) 62084497

INTERNATIONAL SEARCH REPORT
 Information on patent family members

International application No.

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		ES 2578355 T3	26 July 2016

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