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(54) **FABRIC STORAGE TANK OF DYEING MACHINE**

(57) This application is related to a type of fabric storage trough inside a dyeing machine. The storage trough is connected to the exit of the fabric delivery channel. The described storage trough is tilted down to the floor. The body of the storage trough is divided into three sections along the direction of flow. The first section is impermeable curved plate with smooth surface. The following second section is sieve which is liquid permeable and the final section is a row of low friction rods parallel to

the direction of fabric movement. The storage trough is 5-35 degree tilt down to the floor. The rods mentioned in the final section of the fabric storage trough are covered by Teflon material. The application of the mentioned storage trough, rods covered with Teflon material are installed at the bottom of the storage trough, also it is parallel to the movement of the fabric. With the tilt down design of the storage trough, fabrics can move forward by the gravitational force.

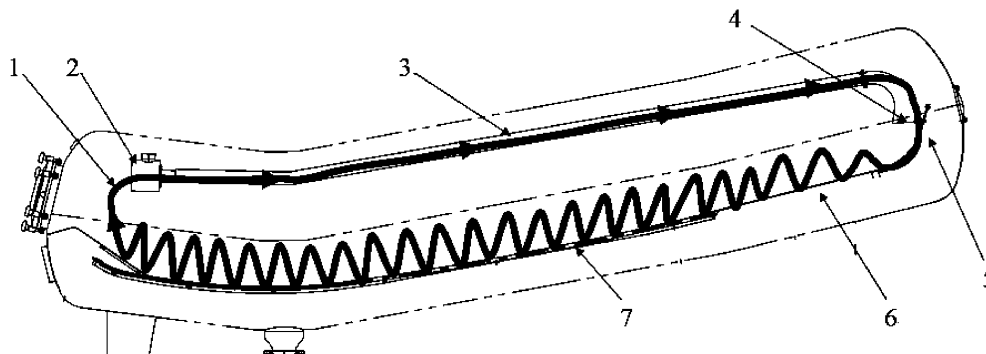


Figure 1

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## Description

### Technical Field

[0001] This invention patent involves a type of dyeing machine storage trough. It can effectively enhance the looping efficiency of the fabric inside the machine. The looping efficiency of the dyeing machine directly affects the fabric loading and liquor-ratio. Thus, the invention of the storage trough is related to the technical field in dyeing industry.

### Background of the Invention

[0002] The dyeing machine storage trough is the key for fabric or gray cloth to run smoothly and stacked regularly. The movement of the stacked fabric is depended to gravitational force, water flow and compression.

[0003] In the field of dyeing industry, L-shape or Longitudinal high temperature dyeing machine are normally used to dye light and thin fabric, especially chemical fiber. These type of dyeing machine allow more tension acting on fabric and the length of the machine allow sufficient time and space for dyeing process inside the Conveyance tube.

[0004] However, low looping efficiency becomes the main issue of using L-shape or Longitudinal high temperature dyeing machine, as plaiting device is not included in the upstream position. To solve the problem, the recent storage trough is designed as diagonal arrangement instead of parallel to the ground. The gravitational force helps the fabric moving from upstream to downstream. Low friction material, for example a row of Teflon rods is placed in the bottom of the storage trough to smoothen the fabric motion,. However, the light and thin fabric is easily spoiled by the turbulence. On the other hand, the design is revised by replacing the Teflon rods to stainless steel plate. The stainless steel plate is highly surface finishing and contain plenty sieves. Those sieves can increase the draining rate of dyeing solution to prevent the generation of turbulence. However, the increase of liquor-ratio and loading drop becomes the disadvantages.

### Disclosure of the invention

[0005] It is an object of the invention to improve the recent dyeing machine storage trough. The invention improves the handling on light and thin fabric especially chemical fiber, increase the looping efficiency and loadings and, lower the liquor-ratio.

[0006] It is an object of invention to include a conveyance tube. The exit of the conveyance tube is connected to the storage trough. The storage trough is designed to have a diagonal arrangement. Also, the storage trough is divided into three sections. The first section is a curved plate, which is impermeable and with a smooth surface. The second section is a plate with sieves and the final

third section is a row of low friction part.

[0007] Furthermore, the said third section is made up by rods paralleled to the direction of fabric movement.

[0008] Furthermore, the rods mentioned in the final section of the fabric storage trough are covered by Teflon material.

[0009] Furthermore, the said third section is made up by smooth plates, the said plates are covered by Teflon material.

[0010] Furthermore, the storage trough has 5 to 35 degrees of the diagonal arrangement.

[0011] The full name of Teflon is Polytetrafluoroethylene, and its abbreviation Teflon, PTFE, F4 etc. Teflon is a unique of fluoro coating with high-performance such as good heat resistance, chemical inertness, Insulation stability and low friction and its basic part is polytef.

the surface of the second section sieve is not smooth, for example, some un-smooth materials.

[0012] Furthermore, the mentioned curved plate in first section of the fabric storage trough extend a section to the bottom of second section.

[0013] The rods as described in third section are covered by a layer of Teflon material.

[0014] The first section has an extended part to the second section. The extended part occupies 1/3 of the second section. Also, there is incision on two sides of the extended part. The lengths of the first and second section are equal. The length of third section is larger than the sum of the first and second section.

[0015] The purpose of dividing the storage trough into three sections is to produce overfeed phenomenon. This phenomenon helps the fabric move smoothly from upstream to downstream, and avoids the scratching. When fabric arrive the exit of the conveyance tube, dyeing solution provided a momentum to the fabric going from upstream to downstream. Large amount of dyeing solution will be drain away through the incision while the remained solution keep flowing on the extended part, thus it generate a differential forward speed to the fabric.

### Description of the drawings

[0016]

Figure 1 is the side view of the present invention  
Figure 2 is the top view of the present invention

thereinto: 1 is fabric, 2 is nozzle, 3 is conveyance tube, 4 is the exit of conveyance tube, 5 is first section of storage trough, 6 is second section, 7 is third section, 8 is storage trough, 9 is extended part

### Embodiments of the Invention

[0017] As shown in figure 1-2, It is an object of invention to include a conveyance tube. The exit of the conveyance tube is connected to the storage trough. The storage trough is designed to have a diagonal arrangement. Also,

the storage trough is divided into three sections. The first section is a curved plate, which is impermeable and with a smooth surface. The second section is a plate with sieves and the third section is a row of low friction rods parallel to the trough.

**[0018]** Furthermore, the storage trough has 5 to 35 degrees of the diagonal arrangement. The rods as described in third section are covered by a layer of Teflon material. The first section has an extended part to the second section. The extended part occupies 1/3 of the second section. Also, there is incision on two sides of the extended part. The lengths of the first and second section are equal. The length of third section is larger than the sum of the first and second section.

**[0019]** A Loop of fabric passes through the conveyance tube by the dyeing solution. The fabric is propelled by the high speed dyeing solution from the nozzle, to the exit of the conveyance tube. The exit of the conveyance tube is bended and tangential to the storage trough. Thus, the fabric can smoothly pass through conveyance tube and storage trough. The entrance of the storage trough is considered as the first section, with the help of low friction impermeable curved plate.

**[0020]** Fabric 1 first travel along conveyance tube 3 from the first inlet 5 entering storage trough 8. Dyeing solution ejected from nozzle 4 propels fabric 1 to the first stage of storage trough 5 onto a smooth, low friction and impermeable curved plate, fabric 1 is then smoothly carried to the second stage of storage trough 6. When fabric 1 passes through the second stage of storage trough 6, dyeing solution will be drained from the bottom sieve plate and enters a relatively high friction section, slowing the speed down. Due to speed difference between the first and second section, fabric 1 will be over fed in the second section, stacking in an organized manner. Stacked fabric 1 will be pushed into the third section 7 of the storage trough, travelling on top a series of low friction tubular bars, aligned parallel to the direction of fabric travel. Because the friction in the third section is low, this prevented clogging of fabric 1 in the second section. When the fabric 1 passes through the third section 7, the fabric 1 will re-enter spraying nozzle 2 completing a cycle.

**[0021]** The storage trough described in this invention is installed with Teflon bars at the bottom, aligned parallel to the travel direction of fabric 1, combing with the tilted trough design, the fabric 1 will naturally fall under gravity. To reduce liquor ratio, the dyeing fluid cycling time needs to be shortened. To prevent interference between fluid from nozzle and fabric 1 at the lower stream of the conveyance tube, a section design approach is taken. By using different design inside the conveyance tube, dyeing fluid be separated from fabric 1 and fabric 1 will then be stacked in an organized manner before re-entering spraying nozzle 2.

**[0022]** It should be noted that this invention patent will not be bounded by the above content description including schematics in terms of structural dimensions, shapes and use of materials. Designs with same, similar or im-

proved working principle including change of components with similar functionalities are all included in the protection of this patent.

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## Claims

1. A storage trough of a dyeing machine, which includes the storage body connected with the exit of fabric delivery channel, **characterized in that:** the mentioned storage trough is tile down to the floor and includes three sections, the first section is a curved plate which is an impermeable and smooth surface; the following second section is sieve which is liquid permeable and the final third section is a row of low friction part.
2. A storage trough of a dyeing machine according to claim 1, **characterized in that:** the said third section is made up by robs paralleled to the direction of fabric movement.
3. A storage trough of a dyeing machine according to claim 2, **characterized in that:** the rods mentioned in the final section of the fabric storage trough are covered by Teflon material.
4. A storage trough of a dyeing machine according to any one of claim 1 to 3, **characterized in that:** the said third section is made up by smooth plates.
5. A storage trough of a dyeing machine according to any one of claim 4, **characterized in that:** the said plates are covered by Teflon material.
6. A storage trough of a dyeing machine according to any one of claim 1 to 3 and 5, **characterized in that:** the tilt down angle of the fabric storage trough is 5 to 35 degree.
7. A storage trough of a dyeing machine according to any one of claim 1 to 3 and 5, **characterized in that:**the surface of the second section sieve is not smooth.
8. A storage trough of a dyeing machine according to any one of claim 1 to 3 and 5, **characterized in that:** the mentioned curved plate in first section of the fabric storage trough extend a section to the bottom of second section.
9. A storage trough of a dyeing machine according to any one of claim 8, **characterized in that:** the fabric storage trough, the length of the extended part is 1/3 of second section.
10. A storage trough of a dyeing machine according to any one of claim 1 to 3 and 5 and 9, **characterized**

**in that:** the length of first and second section in fabric storage trough is the same, and the length of third section of the fabric storage trough is larger than the sum of first and second section.

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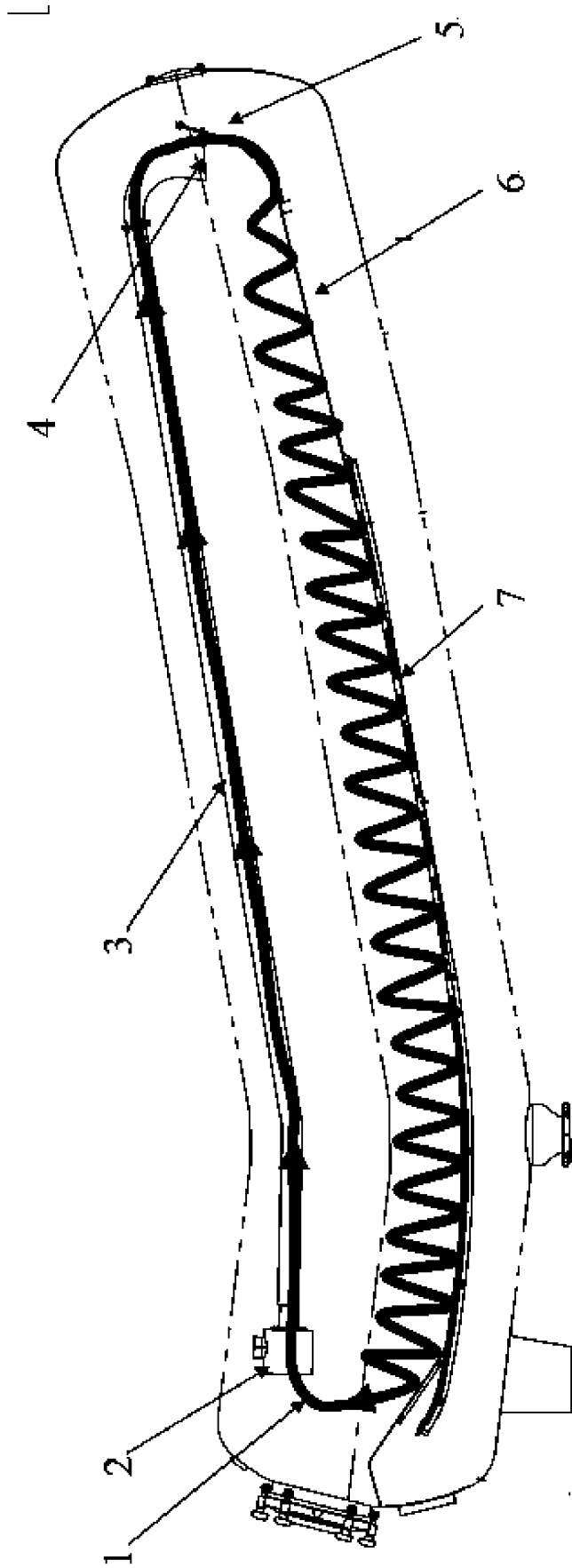


Figure 1

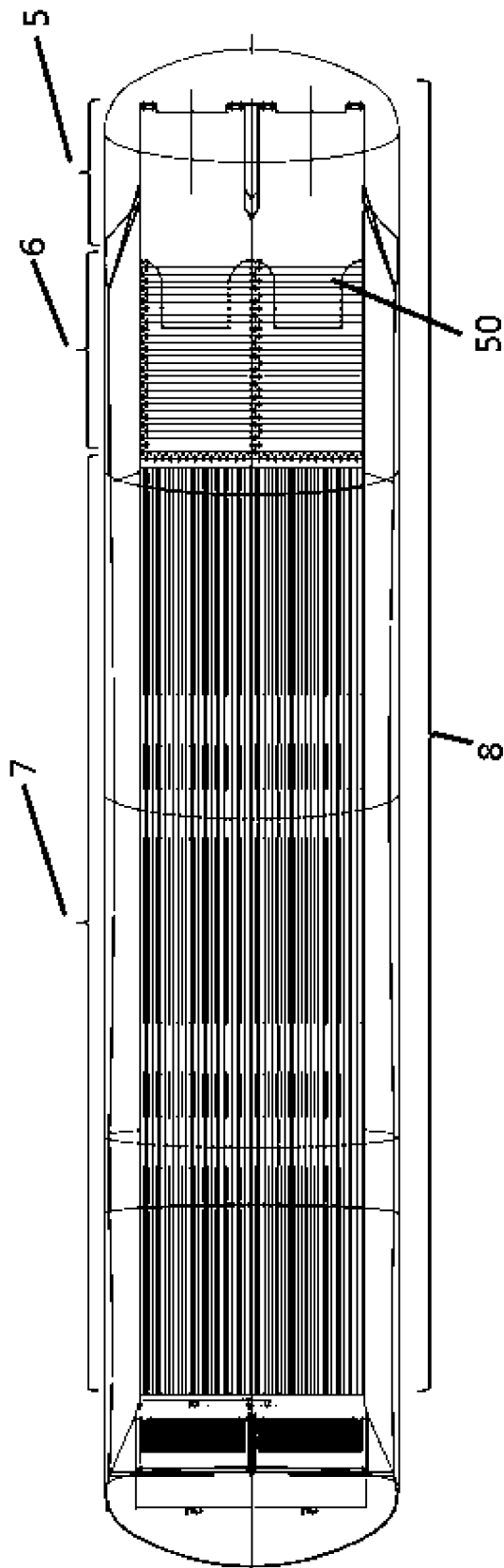


Figure 2

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2016/075433

## 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)

CNKI; CNPAT; DWPI; SIPOABS; ISI WEB OF KNOWLEDGE: FONG'S; XU, Daming; cloth storage groove, sieve pore, pore, device, equipment, machine, overflow dyeing, sterepsinema, skein, loose, sarciniform, rope shaped, smooth, pipe, round bar, wind, knot, abrade, scratch, tongue shape, overflow, madreporic, madreporite, rop+, jet??, flow+, sieve, cribriform, strand??, lamina cribrosa, slid+, tongue

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
E	CN 205242078 U (FONG'S NATIONAL ENGINEERING (SHENZHEN) CO., LTD.), 18 May 2016 (18.05.2016), claims 1-10	1-10
X	CN 104018303 A (FONG'S EUROPE GMBH), 03 September 2014 (03.09.2014), description, paragraphs 47-49, and figures 1-5	1-7, 10
A	EP 0860534 A1 (ZONCO FEDERICO & FIGLIO SPA FEDERICO), 26 August 1998 (26.08.1998), the whole document	1-10
A	DE 29610517 U (BERTOLDI, A.), 29 August 1996 (29.08.1996), the whole document	1-10

 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	"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
"E" earlier application or patent but published on or after the international filing date	"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
"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)	"&" document member of the same patent family
"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	

Date of the actual completion of the international search 12 September 2016 (12.09.2016)	Date of mailing of the international search report <b>27 September 2016 (27.09.2016)</b>
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 <b>WANG, Li'na</b> Telephone No.: (86-10) <b>62084563</b>

Form PCT/ISA/210 (second sheet) (July 2009)

**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

International application No.

**PCT/CN2016/075433**

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