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(54) **METHOD AND DEVICE FOR DETECTING AND REJECTING DEFECT CIGARETTES BEFORE QUANTITATIVE OUTPUT PASSAGES**

(57) The invention is a method and device for detecting and rejecting defective cigarettes before entrance thereof into quantitative output channels. The output ports of cigarette splitting grooves are connected with cigarette detecting channels respectively, the cigarette detecting channels cause cigarettes to be arranged in vertical cigarette flows, which are mutually parallel, the number of the vertical cigarette flows is equal to the number of cigarette discharging channels of the corresponding quantitative cigarette output channels, the flow channel of each vertical cigarette flow is provided with a cigarette quality detection device and a pneumatic rejecting mechanism, the cigarettes to be detected are detected and rejected at appropriate pause time, and the cigarettes which pass the detection directly enter the corresponding cigarette discharging channels of the corresponding quantitative cigarette output channels through transversal one-by-one cigarette pushing mechanisms. The invention can reject unqualified cigarettes before these cigarettes enter into the quantitative cigarette output channels, thereby thoroughly avoiding huge waste caused by rejecting the cigarettes in batches.

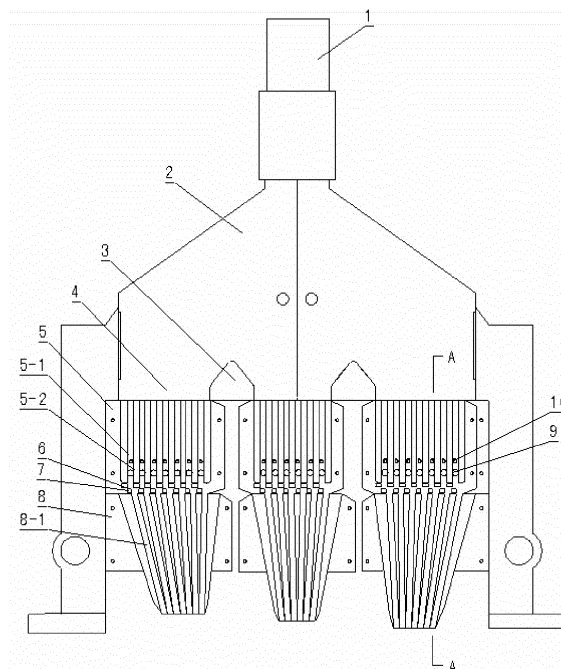


Figure 1

Description

Technical Field

[0001] The invention belongs to cigarette packing machinery, and more particularly, relates to a method and device for detecting and rejecting defective cigarettes before entrance thereof into quantitative output channels.

Background

[0002] The quantitative cigarette arrangement and sorting box of the current cigarette packet packing machine includes the main structure as follows: a hopper connected with cigarette conveying channels, three cigarette splitting grooves located at the bottom of the hopper and formed by two splitting blocks at interval, and three quantitative cigarette output channels respectively connected with the cigarette splitting grooves, typically, the three quantitative cigarette output channels are provided with 7, 6 and 7 cigarette discharging channels respectively, or 7, 7 and 6 cigarette discharging channels respectively, the quantitative cigarette output channels are connected with an intermittent stepping mould box conveying device, and the rear section of the mould box conveying device is provided with a cigarette quality detector.

[0003] The cigarette packet packing machine discussed above has the obvious defects as follows: by adopting a manner of batch rejecting for cigarette batches having empty-end defective cigarettes in the mould box, not only are a large number of packing materials and working hours wasted, but the quality of recycled tobacco is also dramatically reduced, therefore huge waste is caused.

[0004] In order to solve the technical problem above, the application Cigarette Rejecting Method and Device with the publication number CN1545948 discloses a method for rejecting defective cigarettes, including: setting a detecting position and a rejecting position on a quantitative cigarette output channel, i.e. a cigarette discharging channel of a packing machine, and detecting cigarettes at the detecting position by a detector; sending a defect signal to a controller every time an individual defective cigarette is detected; calculating, by the controller, the time at which the defective cigarette reaches the rejecting position, and sending a rejecting signal to a rejecting executer at this moment, and rejecting the defective cigarette corresponding to the rejecting signal at the rejecting position by the rejecting executer. A device thereof includes a detector, a controller and a rejecting executer; the detector and the rejecting executer are installed on a cigarette discharging channel, the detector sends the defect signal to the controller upon detecting a defective cigarette, the controller sends the rejecting signal to the rejecting executer, and the rejecting executer rejects the defective cigarette.

[0005] The method for detecting and rejecting individ-

ual cigarettes at the cigarette discharging channel is adopted in the application discussed above, and the cigarette flow is interrupted by rejecting, so the phenomenon of cigarettes missing in the mould box due to rejecting is unavoidable.

Summary of the Invention

[0006] The objective of the invention is to disclose a method and device for detecting and rejecting defective cigarettes before entrance thereof into quantitative output channels, which, first of all, solves the problem of huge waste caused by detecting defective cigarettes in the mould box and rejecting the defective cigarettes in batches, and further solve the problem of cigarettes missing due to the setting of detecting and rejecting positions in a quantitative cigarette output channel.

[0007] In order to achieve the above objective, the method of the invention is as follows: the output ports of cigarette splitting grooves are connected with cigarette detecting channels respectively, the cigarette detecting channels cause cigarettes to be arranged in vertical cigarette flows which are mutually parallel, the number of the vertical cigarette flows is equal to the number of cigarette discharging channels of corresponding quantitative cigarette output channels, the flow channel of each vertical cigarette flow is provided with a cigarette quality detection device and a pneumatic rejecting mechanism, the cigarettes to be detected are detected and rejected at appropriate pause time, and the cigarettes which pass the detection directly enter the corresponding cigarette discharging channels of the corresponding quantitative cigarette output channels through transversal one-by-one cigarette pushing mechanisms.

[0008] The transversal one-by-one cigarette pushing mechanisms of the vertical cigarette flows operate synchronously, and when the pneumatic rejecting mechanism of any vertical cigarette flow operates in parallel or operates consecutively, the transversal one-by-one cigarette pushing mechanisms of the vertical cigarette flows all delay corresponding transverse pushing cycles.

[0009] The device of the invention includes a hopper, three cigarette splitting grooves at the bottom of the hopper, three quantitative cigarette output channels, cigarette quality detectors, a counting rejecting controller and pneumatic rejecting mechanisms, and the device is characterized in that, a cigarette detecting channel is arranged between each cigarette splitting groove and the corresponding quantitative cigarette output channel, each cigarette detecting channel is provided with a cigarette detecting flow channel composed of parallel and uniformly-distributed partitions, the number of the cigarette detecting flow channels of the cigarette detecting channels is equal to the number of cigarette discharging channels of the corresponding quantitative cigarette output channels, the partition at one side of each cigarette detecting flow channel overlaps or partially overlaps the upper port of the corresponding cigarette discharging

channel in a vertical direction, the rear side plate of each cigarette detecting flow channel is respectively provided with a cigarette quality detector and a cigarette rejecting port located below the detector, a transverse one-by-one pushing mechanism composed of a transversely movable pushing plate and a fixed supporting plate is arranged at the bottom port of each cigarette detecting flow channel, the pushing plate is located on the bottom surface of the partition at the other side of the cigarette detecting flow channel, the bottom port of the cigarette detecting flow channel is blocked off by the transversely movable pushing plate, the pushing plates of the three cigarette detecting channels are all connected with a transmission rod moving transversely in a reciprocating manner, the supporting plate is located at one side of the corresponding pushing plate of the upper port of the cigarette discharging channel, the edge at this side of the cigarette discharging channel overlaps the side of the corresponding supporting plate in a vertical direction, and the distance between the surface of the support plate and the bottom port of the cigarette detecting flow channel is equal to the diameter of a cigarette.

[0010] The distances between the pushing plates of one cigarette detecting channel is equal to the diameter of a cigarette.

[0011] The edge at the cigarette falling side of the supporting plate is provided with a cigarette guiding slope.

[0012] The invention has the effects and advantages that: cigarettes are arranged by the cigarette detecting flow channels of the cigarette detecting channels as cigarette flows, the number of which is corresponding to the number of the cigarette discharging channels of the quantitative cigarette output channels, thus laying a foundation for assessing the quality of cigarettes one by one before the cigarettes enter into the quantitative quality output channel. The cigarette flows in the invention are supported by the supporting plates thereof respectively, so the pause time, which is necessary for quality assessment or rejecting one by one, can be offered. The time for transverse movement of the pushing plate which is combined with the corresponding supporting plate to form a transverse one-by-one pushing mechanism is matched with the operating speed of a cigarette packing system, and the interval for transverse movement is defined by blocking off the cigarette flows and pushing a non-defective cigarette, supported directly on the supporting plate, away from the supporting plate. The non-defective cigarette pushed away from the supporting plate is free from obstruction in its movement direction and falls into the cigarette discharging channel by means of own gravity, so the transverse movement and falling of the detected cigarettes are completed slightly and softly, causing no damage to cigarettes. The transmission rod moving transversely in a reciprocating manner can be driven using the prior arts, such as a cam link mechanism, pneumatic or hydraulic mechanism and the like. The cigarette quality detector, the counting rejecting controller and the pneumatic rejecting mechanism in the in-

vention are all realized using the prior arts and capable of rejecting defective cigarettes accurately. The experiment has proven that the prototype of the invention has a detection and rejecting rate for empty-end (tobaccos unfilled) and defective cigarettes as high as 100% under the packing speed of 400 packets per minute. In a word, the invention can reject unqualified cigarettes before the cigarettes enter into the quantitative cigarette output channel, thus thoroughly avoiding huge waste caused by rejecting the cigarettes in batches. The experiment can also prove that, the distance between one end of a defective cigarette without filter tip in the cigarette detecting flow channel and the cigarette quality detector is random, and this defective cigarette is identified by the cigarette quality detector as the empty-end defective cigarette equally.

Brief Description of the Drawings

[0013]

FIG.1 is a structural schematic diagram of embodiment 1 of the invention.

FIG.2 is an enlarged view of FIG.1 along A-A

FIG.3 is a schematic diagram of the transverse one-by-one pushing mechanism of embodiment 1.

FIG.4 is a schematic diagram of the pushing plate of FIG.3 under a transverse movement state.

FIG.5 is a structural schematic diagram of embodiment 2 of the invention.

FIG.6 is a schematic diagram of the transverse one-by-one pushing mechanism of embodiment 2.

FIG.7 is a schematic diagram of the pushing plate of FIG.6 under a transverse movement state.

[0014] Symbols in the drawings: 1 cigarette conveying channel, 2 hopper, 3 splitting block, 4 cigarette spitting groove, 5 cigarette detecting channel, 5-1 cigarette flow detecting channel, 5-2 partition, 6 pushing plate, 7 supporting plate, 7-1 cigarette guiding slope, 8 quantitative cigarette output channel, 8-1 cigarette discharging channel, 9 cigarette rejecting port, 10, cigarette quality detector, 11 transmission rod, 12 airflow nozzle, 13 rear side plate, 14 transparent front plate, 15 cigarette flow

Detailed Description of the Embodiments

[0015] Further description is made below to the invention with reference to the embodiments and the drawings.

[0016] In the embodiment 1 shown as FIG. 1 and FIG. 2, a cigarette sorting box includes a hopper 2, three cigarette splitting grooves 4 partitioned by splitting blocks 3 and three quantitative cigarette output channels 8, wherein the hopper 2 is connected with a cigarette conveying channel 1. The three quantitative cigarette output channels 8 are provided with 7, 6 and 7 cigarette discharging channels 8-1 respectively.

[0017] A cigarette detecting channel 5 is arranged be-

tween the cigarette splitting groove 4 and the corresponding quantitative cigarette output channel 8, each cigarette detecting channel 5 is provided with a cigarette detecting flow channel 5-1 composed of parallel and uniformly-distributed partitions 5-2. The number of the cigarette detecting flow channels 5-1 of the cigarette detecting channels 5 is equal to the number of the cigarette discharging channels 8-1 of the corresponding quantitative cigarette output channels 8.

[0018] The partition at the right side of each cigarette detecting flow channel in the figures partially overlaps the upper port of the corresponding cigarette discharging channel 8-1 in a vertical direction, a rear side plate 13 of each cigarette detecting flow channel is provided with a cigarette quality detector 10 and a cigarette rejecting port 9 located below the detector, and the distance between the axes of the cigarette quality detector and the cigarette rejecting port in this embodiment is twice the diameter of a cigarette.

[0019] In FIG.1, the bottom port of each cigarette detecting flow channel is provided with a transverse one-by-one pushing mechanism composed of a transversely movable pushing plate 6 and a fixed supporting plate 7, the pushing plate 6 is located on the bottom surface of the partition at the other side, i.e. the left side, of the cigarette detecting flow channel in the figure, and the transversely movable pushing plate 6 blocks off the bottom port of the cigarette detecting flow channel. The distance between one cigarette detecting channel 5 and each of the pushing plates 6 is equal to the diameter of a cigarette and facilitates the positioning of cigarettes subsequent to detection under the supporting of the supporting plate 7.

[0020] In FIG.1, the pushing plates 6 of the three cigarette detecting channels 5 are all connected with a transmission rod moving transversely in a reciprocating manner, shown as FIG.2. The transmission rod 11 in this embodiment is connected with a cam link mechanism and a servo motor is used as the power source thereof.

[0021] Shown as Fig.1, the supporting plate 7 is located at one side of the corresponding pushing plate 6 of the upper port of the cigarette discharging channel 8-1, the edge at this side of the cigarette discharging channel overlaps the side of the corresponding supporting plate in a vertical direction, and the distance between the surface of the supporting plate 7 and the bottom port 5-1 of the cigarette detecting flow channel is equal to the diameter of a cigarette.

[0022] Brief description is made below to the process of detecting and rejecting cigarettes in the embodiment 1 shown as FIG.1 with reference to FIG.3 and FIG.4.

[0023] Shown as FIG.3, the pushing plate 6 is located on the bottom surface of the partition 5-2 of the cigarette detecting flow channel, at this moment, a cigarette flow 15 pauses under the action of the supporting plate 7, and cigarettes are detected and rejected under the pause state. Rejecting is completed in such a manner that a cigarette quality detector 10 sends a defective cigarette

signal to a PLC, the PLC enables the servo motor to stop operating and enables the pushing plate 6 to be located on the bottom surface of the partition 5-2 of the cigarette detecting flow channel, and simultaneously, a counting rejecting controller is initiated, the counting time is equal to the time for a defective cigarette to fall onto the cigarette rejecting port from the detecting position. Once the counting time is over, the PLC sends a rejecting command to start up the pneumatic rejecting mechanism, and an airflow ejected from an airflow nozzle 12 in FIG. 2 drives the defective cigarette out of the cigarette rejecting port 9. At the same time, the PLC also sends a detecting command so that the cigarette temporarily remaining at the detecting position is detected in time. In the event that the cigarette quality detector 10 sends a consecutive defective cigarette signal to the PLC, it means consecutive defective cigarettes are present in the cigarette flow 15, e.g. two defective cigarettes, in this case, the PLC continuously initiates the counting rejecting controller twice while enabling the servo motor to stop operating and enabling the pushing plate 6 to be located on the bottom surface of the partition 5-2 of the cigarette detecting flow channel, and the rejecting command is included in each initiation.

[0024] Shown as FIG.4, when no defective cigarette is detected by the cigarette quality detector, the pushing plates 6 are transversely moved under the driving of the transmission rod along a direction shown as the arrow a in FIG.4 to block off the cigarette detecting flow channel, meanwhile, a non-defective cigarette supported directly on the supporting plate is pushed away from the supporting plate and falls into the cigarette discharging channel 8-1 by means of own gravity along a direction shown as the arrow b in FIG.4. It can be seen from FIG.3 and FIG. 4 that the invention achieves the objective of detecting and rejecting defective cigarettes before the cigarettes enter into the quantitative cigarette output channel.

[0025] In the embodiment 2 shown as Fig.5, the cigarette sorting box comprising a cigarette conveying channel 1, a hopper 2, splitting blocks 3, cigarette splitting grooves 4, three quantitative cigarette output channels 8 and cigarette discharging channels 8-1 are basically structurally identical to the cigarette sorting box in the embodiment 1 shown as FIG. 1. Meanwhile, similar to the embodiment 1, a cigarette detecting channel 5 is arranged between each cigarette splitting groove 4 and the corresponding quantitative cigarette output channel 8, each cigarette detecting channel 5 is provided with a cigarette detecting flow channel 5-1 composed of parallel and uniformly-distributed partitions 5-2. The number of the cigarette detecting flow channels 5-1 of the cigarette detecting channels 5 is equal to the number of the cigarette discharging channels 8-1 of the corresponding quantitative cigarette output channels 8.

[0026] The difference between the embodiment 2 and the embodiment 1 is that, the partition at the right side of the cigarette detecting flow channel 5-1 partially overlaps the upper port of the corresponding cigarette discharging

channel 8-1 in a vertical direction, and a cigarette quality detector 10 and a cigarette rejecting port 9 arranged on each cigarette detecting flow channel as well as the distance between the axes of the both are identical to those in the embodiment 1.

[0027] Shown as FIG.5, FIG.6 and FIG.7, the bottom port of each cigarette detecting flow channel 5-1 is provided with a transverse one-by-one pushing mechanism composed of a transversely movable pushing plate 6 and a fixed supporting plate 7, the pushing plate 6 is located on the bottom surface of the partition at the left side of the cigarette detecting flow channel in the figure, and the transversely movable pushing plate 6 blocks off the bottom port of the cigarette detecting flow channel. The distance between one cigarette detecting channel 5 and each of the pushing plates 6 is equal to the diameter of a cigarette and facilitates the positioning of the cigarettes subsequent to detection under the supporting of the supporting plate 7.

[0028] In FIG.5, the pushing plates 6 of the three cigarette detecting channels 5 are all connected with a transmission rod moving transversely in a reciprocating manner, just as in the embodiment 1.

[0029] Shown as FIG.5, FIG.6 and FIG.7, the supporting plate 7 is located at one side of the corresponding pushing plate 6 of the upper port of the cigarette discharging channel 8-1, the edge at this side of the cigarette discharging channel overlaps the side of the corresponding supporting plate in a vertical direction, the edge of the cigarette falling side of the supporting plate is provided with a cigarette guide slope 7-1, and the distance between the surface of the support plate 7 and the bottom port of the cigarette detecting flow channel 5-1 is equal to the diameter of a cigarette.

[0030] The process of detecting and rejecting cigarettes in the embodiment 2 is identical to that in the embodiment 1, however, the interval for transverse movement of the pushing plate 6 is wider than that in the embodiment 1 since the partition at the right side of the cigarette detecting flow channel 5-1 overlaps the upper port of the corresponding cigarette discharging channel 8-1 in a vertical direction. When the pushing plate 6 is transversely moved along a direction shown as the arrow a in FIG.7, a non-defective cigarette directly supported on the supporting plate 7 falls, along the cigarette guide slope 7-1 at the cigarette falling side of the supporting plate, into the cigarette discharging channel 8-1 by means of own gravity in a direction shown as the arrow b in FIG.7.

Claims

1. A method for detecting and rejecting defective cigarettes before entrance thereof into quantitative output channels, **characterized in that:** the output ports of the cigarette splitting grooves are connected with the cigarette detecting channels, respectively, the cigarette detecting channels cause cigarettes to

be arranged in vertical cigarette flows, which are mutually parallel, the number of the vertical cigarette flows is equal to the number of cigarette discharging channels of the corresponding quantitative cigarette output channels, the flow channel of each vertical cigarette flow is provided with a cigarette quality detection device and a pneumatic rejecting mechanism, the cigarettes to be detected are detected and rejected at appropriate pause time, and the cigarettes which pass the detection directly enter the corresponding cigarette discharging channels of the corresponding quantitative cigarette output channels through transversal one-by-one cigarette pushing mechanisms.

2. The method for detecting and rejecting defective cigarettes according to claim 1, **characterized in that:** the transversal one-by-one cigarette pushing mechanisms of the vertical cigarette flows operate synchronously, and when the pneumatic rejecting mechanism of any vertical cigarette flow operates or operates consecutively, the transversal one-by-one cigarette pushing mechanisms of the vertical cigarette flows all delay corresponding transverse pushing cycles.
3. A device for detecting and rejecting defective cigarettes before entrance thereof into quantitative output channels, including a hopper, three cigarette splitting grooves at the bottom of the hopper, three quantitative cigarette output channels, cigarette quality detectors, a counting rejecting controller and pneumatic rejecting mechanisms, **characterized in that:** a cigarette detecting channel is arranged between each cigarette splitting groove and the corresponding quantitative cigarette output channel, each cigarette detecting channel is provided with a cigarette detecting flow channel composed of parallel and uniformly-distributed partitions, the number of the cigarette detecting flow channels of the cigarette detecting channels is equal to the number of cigarette discharging channels of the corresponding quantitative cigarette output channels, the partition at one side of each cigarette detecting flow channel overlaps or partially overlaps the upper port of the corresponding cigarette discharging channel in a vertical direction, the rear side plate of each cigarette detecting flow channel is respectively provided with a cigarette quality detector and a cigarette rejecting port located below the detector, a transverse one-by-one pushing mechanism composed of a transversely movable pushing plate and a fixed supporting plate is arranged at the bottom port of each cigarette detecting flow channel, the pushing plate is located on the bottom surface of the partition at the other side of the cigarette detecting flow channel, the bottom port of the cigarette detecting flow channel is blocked off by the transversely movable push-

ing plate, the pushing plates of the three cigarette detecting channels are all connected with a transmission rod moving transversely in a reciprocating manner, the supporting plate is located at one side of the corresponding pushing plate of the upper port of the cigarette discharging channel, the edge at this side of the cigarette discharging channel overlaps the side of the corresponding supporting plate in a vertical direction, and the distance between the surface of the support plate and the bottom port of the cigarette detecting flow channel is equal to the diameter of a cigarette.

4. The device according to claim 3, **characterized in that:** the distance between the pushing plates of one cigarette detecting channel is equal to the diameter of a cigarette.
5. The device according to claim 3, **characterized in that:** the edge at the cigarette falling side of the supporting plate is provided with a cigarette guiding slope.

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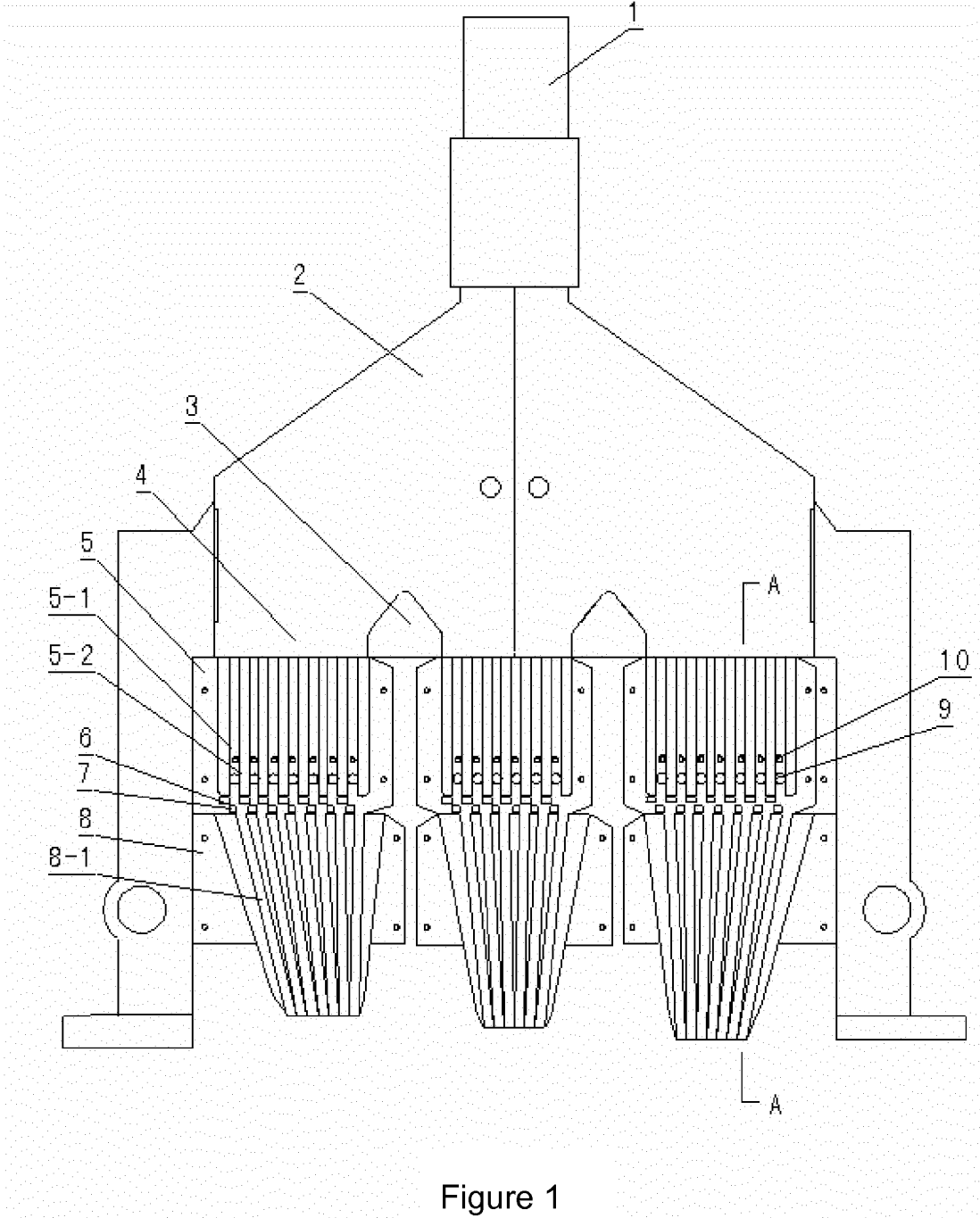
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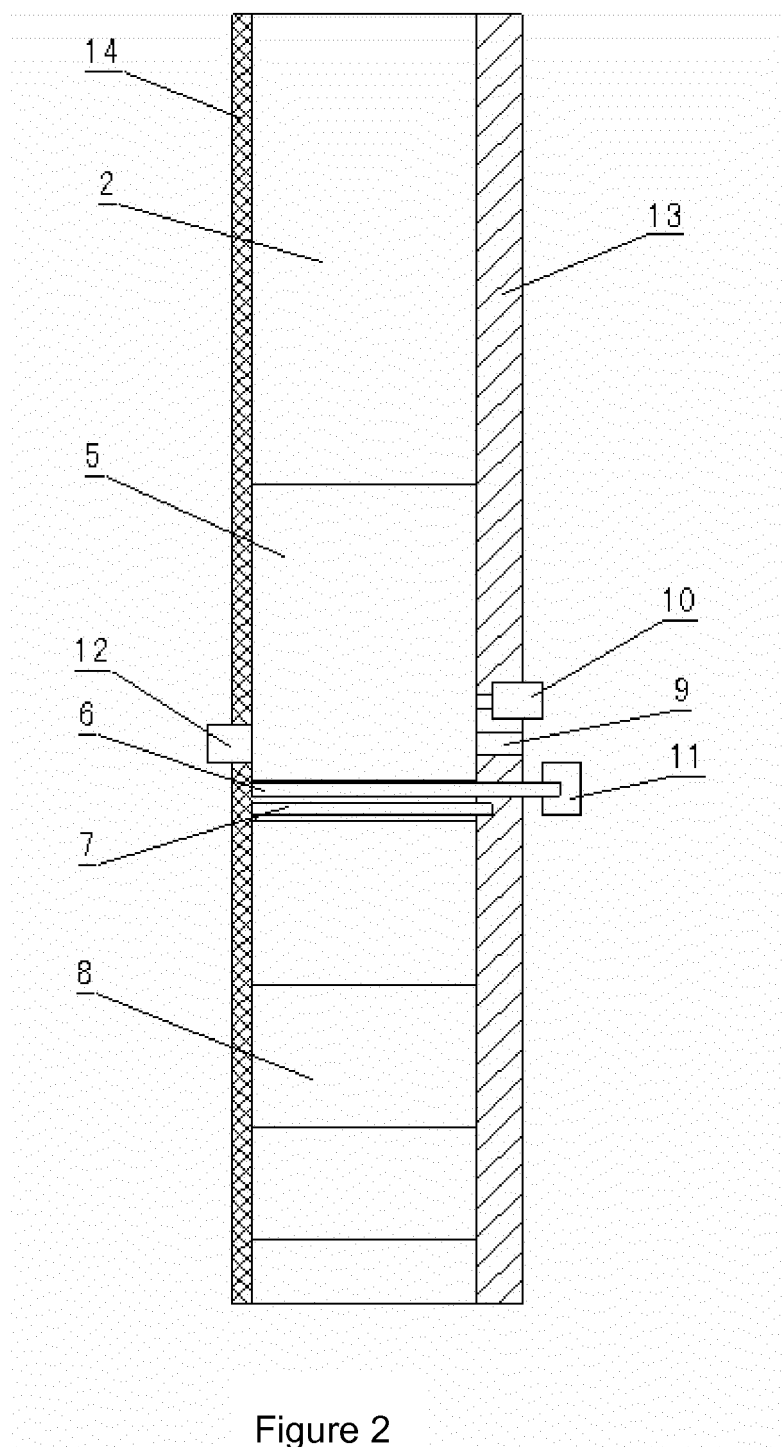


Figure 2

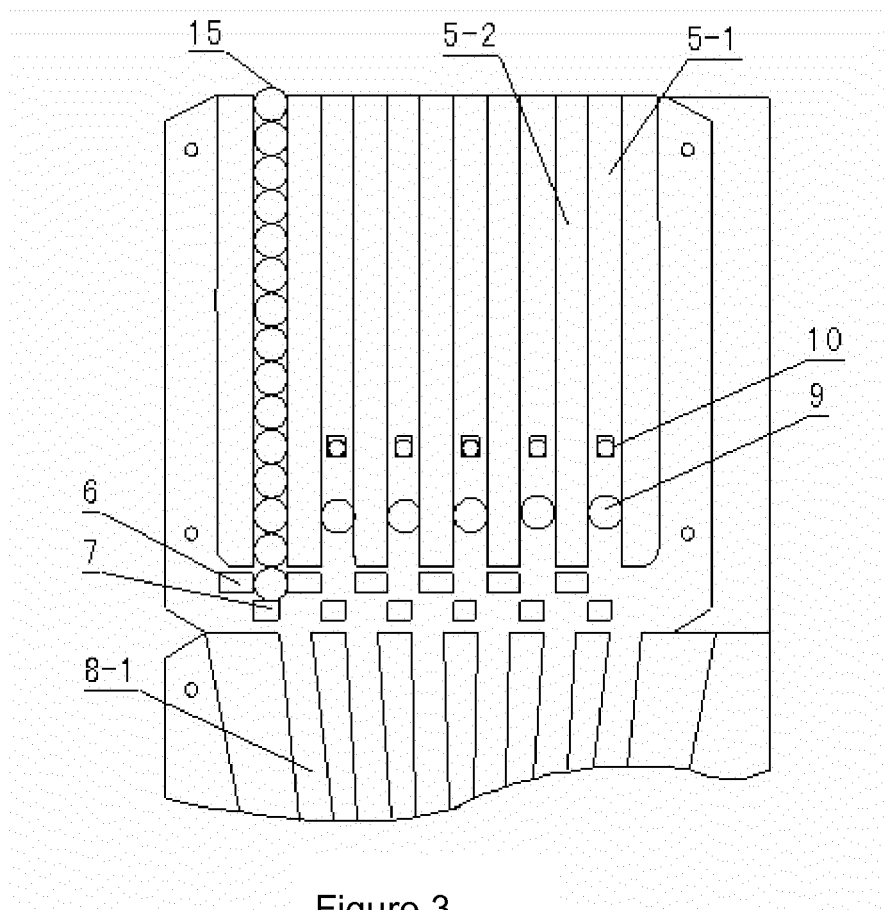


Figure 3

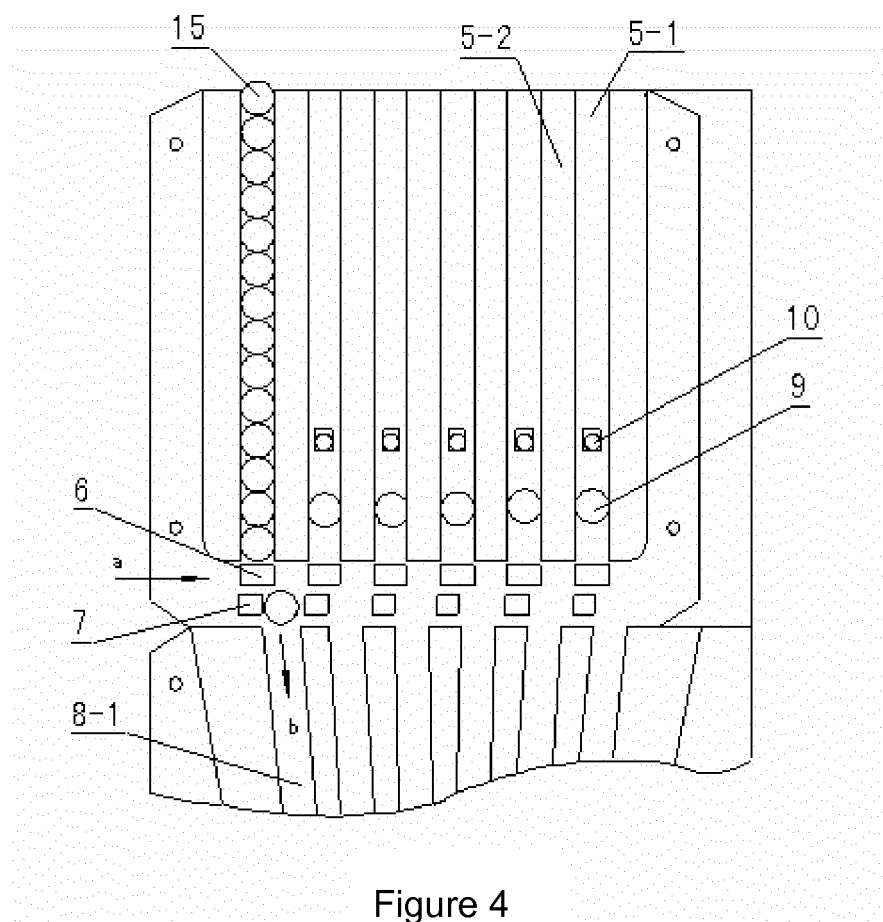
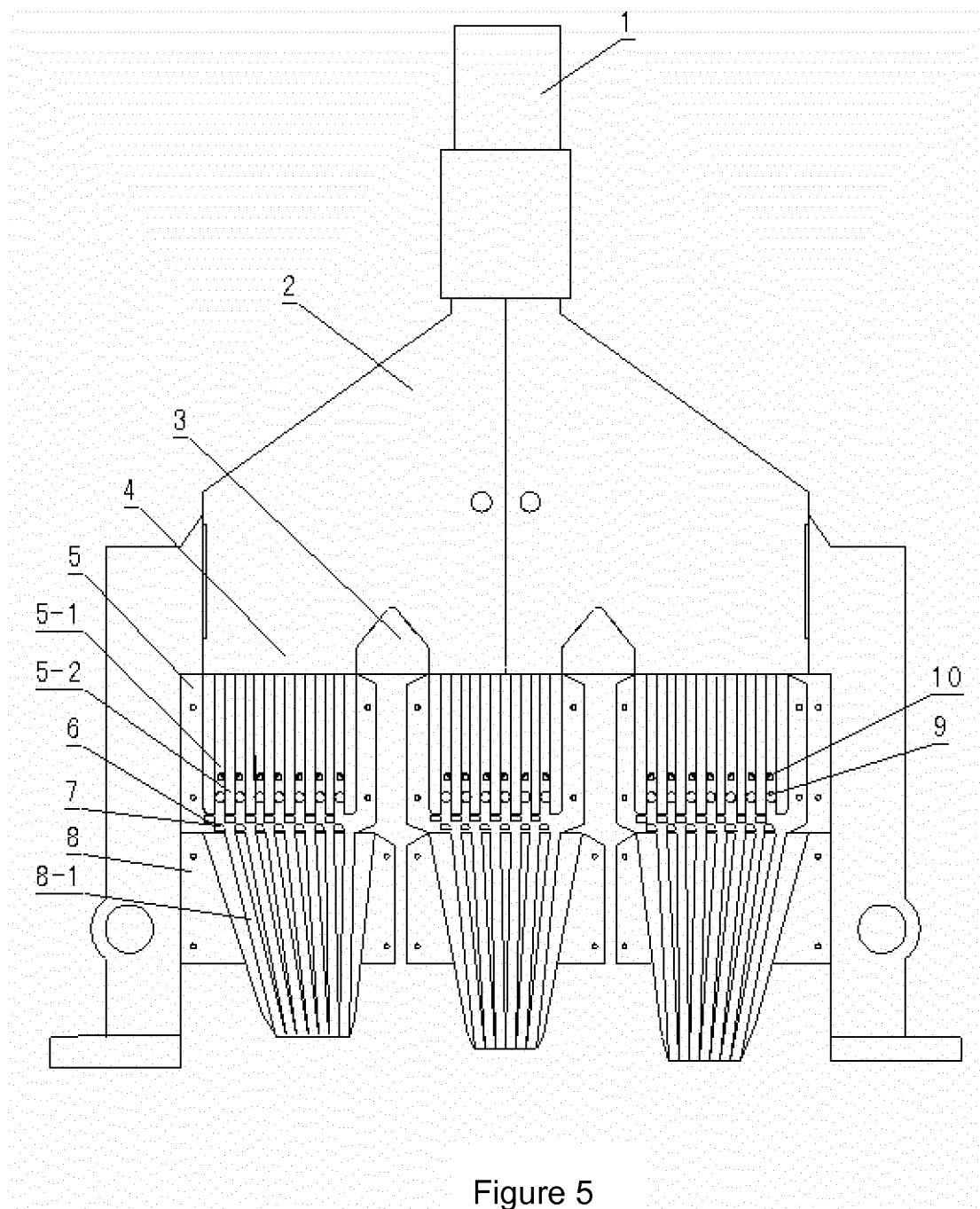


Figure 4



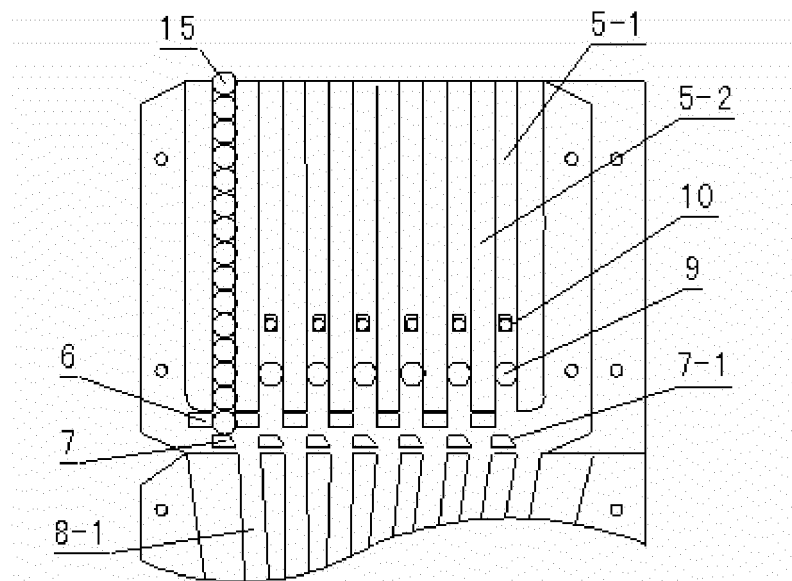


Figure 6

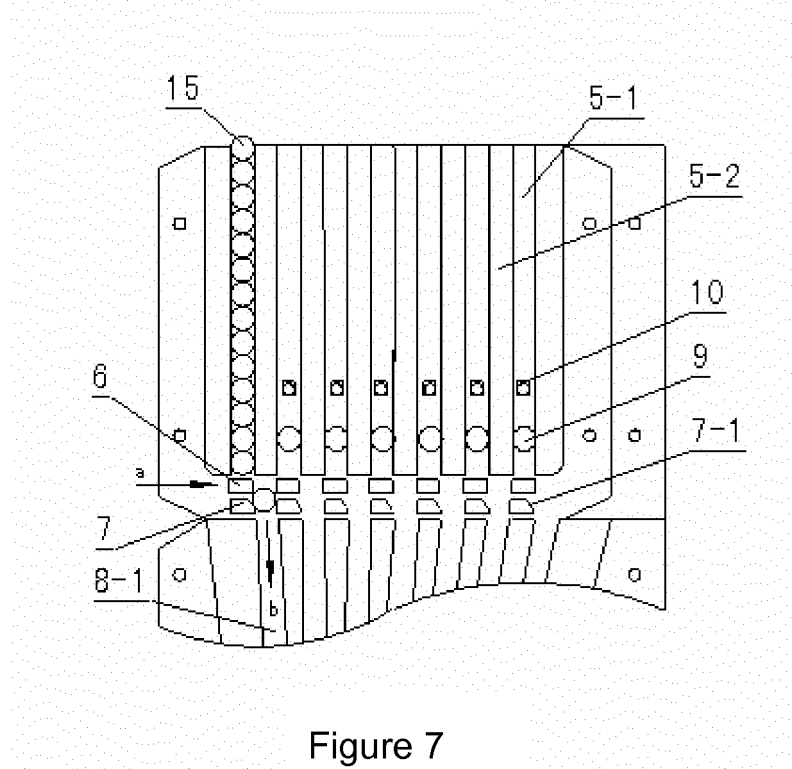


Figure 7

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2010/074047

A. CLASSIFICATION OF SUBJECT MATTER

See extra sheet

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)

IPC: A24C 5/+, B65B 19/+, B07C 5/+

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)

EPODOC, WPI, CNPAT, CNKI: cigarette, detect, check,, test, inspect, examine, defect, faulty, reject, remove, JIAO Shengli

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN201494638U (JIAO, Shengli), 02 Jun. 2010 (02.06.2010), claims 1-3, page 2 line 22 - page 4 line 13, figures 1-7	3-5
X	CN87104322A (FOCKE & CO), 10 Feb. 1988 (10.02.1988), page 2 line 8 –	1-2
A	page 5 line 26, figures 1-6, claims 1-10	3-5
X	CN1501078A (FOCKE & CO), 02 Jun. 2004 (02.06.2004), page 2 line 6 – page	1-2
A	4 line 8, figures 1-2	3-5
X	US4648232A (NIEPMANN & CO MASCHF FR), 10 Mar. 1987 (10.03.1987),	1-2
A	column 5 line 26 – column 8 line 29, figures 1-6	3-5
PA	CN201457761U (JIAO, Shengli), 12 May 2010 (12.05.2010), column 3 line 31 – column 4 line 40, figures 1-6	1-5

☒ 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
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“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
26 Aug. 2010 (26.08.2010)Date of mailing of the international search report
23 Sep. 2010 (23.09.2010)Name and mailing address of the ISA/CN
The State Intellectual Property Office, the P.R.China
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INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2010/074047

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN1264038A (FOCKE & CO), 23 Aug. 2000 (23.08.2000), page 3 line 6 – page 6 line 13, figures 1-4, abstract	1-5
A	CN1545948A (ZHANG, Ming et al.), 17 Nov. 2004 (17.11.2004), page 3 line 14 – page 4 line 13, figures 1-4, abstract	1-5
A	US4174780A (MOLINS LTD), 20 Nov. 1979 (20.11.1979), column 2 line 43 – column 4 line 40, figures 1-3, abstract	1-5
A	US6050424A (GD SPA), 18 Apr. 2000 (18.04.2000), column 2 line 11 – column 4 line 62, figures 1-4, abstract	1-5
A	DE2006425A1 (SCHMERMUND, Alfred), 13 Aug. 1970 (13.08.1970), pages 3-5, figures 1-2, abstract	1-5

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

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/CN2010/074047

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN201494638U	02.06.2010	NONE	
CN87104322A	10.02.1988	CN1008235B	06.06.1990
		EP0249791A	23.12.1987
		EP0249791B1	23.09.1992
		DE3620735A	23.12.1987
		DE3781834G	29.10.1992
		US4953711A	04.09.1990
		BR8703086A	08.03.1988
		CA1323331C	19.10.1993
		JP63003781A	08.01.1988
		JP2556516B2	20.11.1996
CN1501078A	02.06.2004	EP1419967A	19.05.2004
		DE10252913A	27.05.2004
		CN100492002C	27.05.2009
		JP2004159658A	10.06.2004
		BR0305312A	15.06.2004
		US2004148908A	05.08.2004
		US7021125B	04.04.2006
US4648232A	10.03.1987	EP0198282A	22.10.1986
		EP0198282B	24.02.1988
		DE3609094A	23.10.1986
		DE3660025G	31.03.1988
		JP61240583A	25.10.1986
		AT32585T	15.03.1988
CN201457761U	12.05.2010	NONE	
CN1264038A	23.08.2000	DE19903777A	03.08.2000
		JP2000217564A	08.08.2000
		JP4343375B2	14.10.2009
		EP1026079A	09.08.2000
		CN1199039C	27.04.2005
		BR0000542 A	31.10.2000
		US6446632B	10.09.2002
CN1545948A	17.11.2004	NONE	
US4174780A	20.11.1979	DE2826539A	11.01.1979
		DE2826539C	27.09.1984
		GB2001839A	14.02.1979
		GB2001839B	03.02.1982

Form PCT/ISA /210 (patent family annex) (July 2009)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/CN2010/074047

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
US6050424A	18.04.2000	IT1110485B	23.12.1985
		JP54014600A	02.02.1979
		JP56050831B	01.12.1981
		JP1114128C	29.09.1982
		EP0857651A1	12.08.1998
		EP0857651B1	11.04.2001
		JP10310105A	24.11.1998
		ITBO970057A	11.08.1998
		IT1290673B	10.12.1998
		DE69800673E	17.05.2001
DE2006425A1	13.08.1970	JP10310105A	24.11.1998
		BE745950A	16.07.1970
		FR2035721A	18.12.1970
		CH510999A	15.08.1971
		GB1249570A	13.10.1971

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2010/074047

A. CLASSIFICATION OF SUBJECT MATTER

A24C 5/345 (2006.01) i

A24C 5/34 (2006.01) i

B65B 19/30 (2006.01) i

B07C 5/00 (2006.01) i

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- CN 1545948 [0004]