

(12) **EUROPEAN PATENT APPLICATION**  
published in accordance with Art. 153(4) EPC

(43) Date of publication:  
**24.04.2024 Bulletin 2024/17**

(51) International Patent Classification (IPC):  
**C25D 1/04** <sup>(2006.01)</sup>      **C25D 19/00** <sup>(2006.01)</sup>  
**C25D 17/00** <sup>(2006.01)</sup>      **C25D 7/06** <sup>(2006.01)</sup>

(21) Application number: **23768455.0**

(86) International application number:  
**PCT/CN2023/083518**

(22) Date of filing: **23.03.2023**

(87) International publication number:  
**WO 2024/051152 (14.03.2024 Gazette 2024/11)**

(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 ME MK MT NL**  
**NO PL PT RO RS SE SI SK SM TR**  
 Designated Extension States:  
**BA**  
 Designated Validation States:  
**KH MA MD TN**

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(30) Priority: **07.09.2022 CN 202222378968 U**

(54) FLEXIBLE FOIL PRODUCTION SYSTEM

(57) The utility model provides a production system of a flexible foil, and relates to the technical field of water electroplating. The production system of the flexible foil includes a first solution accumulation roll, a tension roll, a first conductor roll, and a second conductor roll that are sequentially arranged along a conducting direction of a film, where the film sequentially passes through the first solution accumulation roll, the tension roll, the first conductor roll and the second conductor roll: the tension roll

and the second conductor roll come in contact with an upper surface of the film; the first conductor roll comes in contact with a lower surface of the film; and a contact position of the film and the tension roll is located horizontally higher than a contact position of the film and the first solution accumulation roll. The utility model can greatly reduce copper plating on the conductor roll, prevents crystals of the plating solution on the conductor roll, and prevents the crystals from piercing the film.

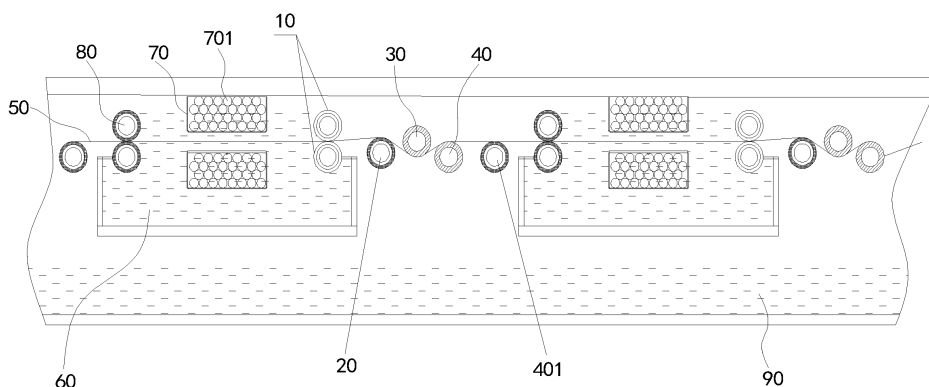


FIG. 1

## Description

### TECHNICAL FIELD

[0001] The utility model relates to the technical field of water electroplating, and in particular to a production system of a flexible foil.

### BACKGROUND

[0002] With the development of modern industrial technologies, surface plating of a flexible film substrate is increasingly popular, and has been widely applied to high-performance automotive films, plasma TV flat-panel displays, touch screens, solar cells, flexible printed circuit (FPC) boards, chip on film (COF) technology, etc. In industrial production, the flexible film substrate is usually electroplated with a water electroplating device. Specifically, based on various demands of the main body and plating layer, a water plating solution is prepared, such that the flexible film substrate can be electroplated in a short time through the water plating solution.

[0003] In the prior art, water electroplating is used to produce a film product with a certain conductivity. However, in the water electroplating process, the conductor roll is plated with copper, or the plating solution on the conductor roll is crystallized.

### SUMMARY

[0004] In view of defects of the prior art, the utility model provides a production system of a flexible foil, to solve the problem of copper plating on a conductor roll.

[0005] The utility model uses the following technical solutions to solve the technical problem: A production system of a flexible foil includes a first solution accumulation roll, a tension roll, a first conductor roll, and a second conductor roll that are sequentially arranged along a conducting direction of a film, where the film sequentially passes through the first solution accumulation roll, the tension roll, the first conductor roll and the second conductor roll; the tension roll and the second conductor roll come in contact with an upper surface of the film; the first conductor roll comes in contact with a lower surface of the film; and a contact position of the film and the tension roll is located horizontally higher than a contact position of the film and the first solution accumulation roll.

[0006] According to the above structure, the production system of a flexible foil further includes an electroplating bath; the first solution accumulation roll is located at a tail end of the electroplating bath; the first solution accumulation roll includes two roll bodies that are identical in structure and are arranged side by side; and the film passes through a space between the two roll bodies.

[0007] According to the above structure, the production system of a flexible foil further includes titanium baskets; the titanium baskets are located in a plating solution of the electroplating bath; copper balls are provided in

the titanium baskets; and the film is located in the plating solution of the electroplating bath, and passes through a space between the adjacent titanium baskets.

[0008] According to the above structure, the production system of a flexible foil further includes a second solution accumulation roll; the first solution accumulation roll and the second solution accumulation roll are respectively located at two sides of the electroplating bath; and the film in the electroplating bath sequentially passes through the second solution accumulation roll, the titanium baskets and the second solution accumulation roll.

[0009] According to the above structure, a solution storage groove is further arranged under the electroplating bath.

[0010] According to the above structure, a speed regulating roll is provided behind the second conductor roll.

[0011] According to the above structure, the first conductor roll and the second conductor roll are connected through a lead, such that a current on the first conductor roll is identical to a current on the second conductor roll.

[0012] The utility model has the following beneficial effects: The utility model can greatly reduce copper plating on the conductor roll, prevents crystals of the plating solution on the conductor roll, prevents the crystals from piercing the film, and improves a quality of the plated product.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0013] FIG. 1 is a schematic structural view of a production system of a flexible foil according to the utility model.

### DETAILED DESCRIPTION OF THE EMBODIMENTS

[0014] The following describes the utility model in detail with reference to the accompanying drawings and embodiments.

[0015] In order to make the objectives, features, and effects of the utility model fully understood, the concepts, specific structures, and technical effects of the utility model will be clearly and completely described below in conjunction with the embodiments and accompanying drawings. Apparently, the described embodiments are merely some rather than all of the embodiments of the utility model. All other embodiments obtained by those skilled in the art based on the embodiments of the utility model without creative efforts should fall within the protection scope of the utility model. In addition, all the coupling/connection relations involved in the utility model do not only refer to the direct connection of the components, but refer to the fact that a better connection structure can be formed by adding or reducing connection accessories according to specific implementation conditions. The various technical features created by the utility model can be combined interactively under the premise of not conflicting with each other.

[0016] Referring to FIG. 1, the utility model provides a

production system of a flexible foil. Specifically, the system includes first solution accumulation roll 10, tension roll 20, first conductor roll 30, and second conductor roll 40 that are sequentially arranged along a conducting direction of film 50. The film 50 sequentially passes through the first solution accumulation roll 10, the tension roll 20, the first conductor roll 30 and the second conductor roll 40. The tension roll 20 and the second conductor roll 40 come in contact with an upper surface of the film 50. The first conductor roll 30 comes in contact with a lower surface of the film 50. The upper surface and the lower surface of the film 50 are conducted through the first conductor roll 30 and the second conductor roll 40.

**[0017]** In the embodiment, a contact position of the film 50 and the tension roll 20 is located horizontally higher than a contact position of the film 50 and the first solution accumulation roll 10. Referring to FIG. 1, it can be understood that the film 50 between the first solution accumulation roll 10 and the tension roll 20 forms an included angle with a horizontal plane, and is tilted along a direction of the tension roll 20. In this case, the plating solution does not reach the first conductor roll 30 along the film 50, and copper is not plated on the first conductor roll 30 under an action of a current.

**[0018]** Further, the first conductor roll 30 and the second conductor roll 40 are connected through a lead, such that a current on the first conductor roll 30 is identical to a current on the second conductor roll 40, and voltages at two ends of the film 50 are the same. Therefore, even in case of small holes on the film 50, a short circuit is not caused to prevent hole burning.

**[0019]** Referring also to FIG. 1, the utility model provides a specific embodiment for the production system of a flexible foil. The production system of a flexible foil includes electroplating bath 60, titanium baskets 70, and second solution accumulation roll 80. The first solution accumulation roll 10 and the second solution accumulation roll 80 are respectively located at two sides of the electroplating bath 60. The film 50 in the electroplating bath 60 sequentially passes through the second solution accumulation roll 80, the titanium baskets 70 and the second solution accumulation roll 80. The first solution accumulation roll 10 and the second solution accumulation roll 80 have a same structure, and include two roll bodies that are identical in structure and are arranged side by side. The film 50 passes through a space between the two roll bodies. The titanium baskets 70 are located in a plating solution of the electroplating bath 60. Copper balls are provided in the titanium baskets 70. The film 50 is located in the plating solution of the electroplating bath 60, and passes through a space between the adjacent titanium baskets 70.

**[0020]** In addition, in the embodiment, solution storage groove 90 is further arranged under the electroplating bath 60. The solution storage groove 90 functions to circulate the plating solution. Speed regulating roll 401 is provided behind the second conductor roll 40.

**[0021]** A wrap angle of the first conductor roll 30 with

the film 50 is two times a wrap angle of the second conductor roll 40. An arc length of the film corresponding to the wrap angle is longer to increase a contact area between the film 50 and the roll.

**[0022]** With the above structure, the production system of a flexible foil provided by the utility model can greatly reduce copper plating on the conductor roll, prevents crystals of the plating solution on the conductor roll, prevents the crystals from piercing the film 50, and improves a quality of the plated product.

**[0023]** The above merely describes specific embodiments of the utility model, but the utility model is not limited thereto. A person skilled in the art can make modifications or replacements without departing from the spirit of the utility model, and these modifications or replacements shall fall within the protection scope of the claims of the utility model.

**[0024]** The production system of a flexible foil provided by the utility model can greatly reduce copper plating on the conductor roll, prevents crystals of the plating solution on the conductor roll, prevents the crystals from piercing the film, and improves a quality of the plated product. Therefore, the production system of a flexible foil provided by the utility model is practical.

## Claims

1. A production system of a flexible foil, comprising a first solution accumulation roll, a tension roll, a first conductor roll, and a second conductor roll that are sequentially arranged along a conducting direction of a film, wherein the film sequentially passes through the first solution accumulation roll, the tension roll, the first conductor roll and the second conductor roll; the tension roll and the second conductor roll come in contact with an upper surface of the film; the first conductor roll comes in contact with a lower surface of the film; and a contact position of the film and the tension roll is located horizontally higher than a contact position of the film and the first solution accumulation roll.
2. The production system of the flexible foil according to claim 1, further comprising an electroplating bath, wherein the first solution accumulation roll is located at a tail end of the electroplating bath; the first solution accumulation roll comprises two roll bodies that are identical in structure and are arranged side by side; and the film passes through a space between the two roll bodies.
3. The production system of the flexible foil according to claim 2, further comprising titanium baskets, wherein the titanium baskets are located in a plating solution of the electroplating bath; copper balls are provided in the titanium baskets; and the film is located in the plating solution of the electroplating bath,

and passes through a space between the adjacent titanium baskets.

4. The production system of the flexible foil according to claim 3, further comprising a second solution accumulation roll, wherein the first solution accumulation roll and the second solution accumulation roll are respectively located at two sides of the electroplating bath; and the film in the electroplating bath sequentially passes through the second solution accumulation roll, the titanium baskets and the second solution accumulation roll. 5  
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5. The production system of the flexible foil according to claim 2, wherein a solution storage groove is further arranged under the electroplating bath. 15
6. The production system of the flexible foil according to claim 1, wherein a speed regulating roll is provided behind the second conductor roll. 20
7. The production system of the flexible foil according to claim 1, wherein the first conductor roll and the second conductor roll are connected through a lead, such that a current on the first conductor roll is identical to a current on the second conductor roll. 25

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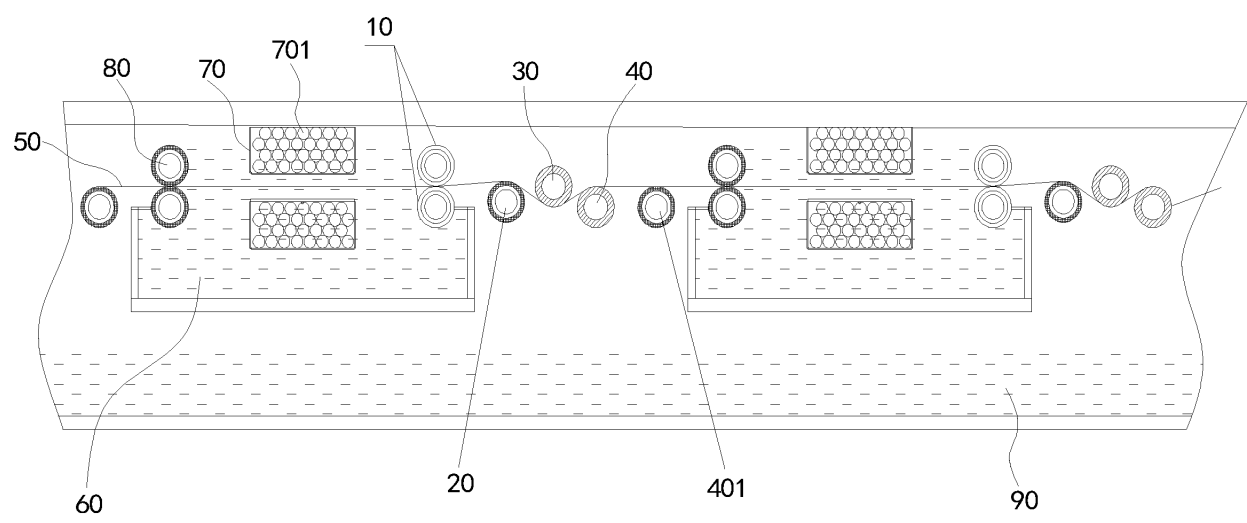


FIG. 1

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2023/083518

## A. CLASSIFICATION OF SUBJECT MATTER

C25D1/04(2006.01)i; C25D19/00(2006.01)i; C25D17/00(2006.01)i; C25D7/06(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)

C25D

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)

CNXTX, DWPI, ENTXT, ENTXTC, VEN, CNKI: 电镀, 镀覆, 镀敷, 积液辊, 挤压辊, 挤液辊, 挡液辊, 截液辊, 压辊, 导电辊, 通电辊, 阴极辊, 张力辊, 水平, 平面, 高度, 夹角, 倾斜, 调速辊, 等电势, 等电位, 电流, 电压, 电位, 电势, 相等, electroplating, plat, roller, liquid accumulation, conduct, cathode, tension, horizontal, height, speed, regulate, current, voltage, electric potential, equat, equal potential, equipotential

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 218175148 U (CHONGQING JIMAT NEW MATERIAL TECHNOLOGY CO., LTD.) 30 December 2022 (2022-12-30) claims 1-7	1-7
Y	CN 215947437 U (CHONGQING JIMAT NEW MATERIAL TECHNOLOGY CO., LTD.) 04 March 2022 (2022-03-04) description, paragraphs [0039]-[0054], and figures 1-2	1-7
Y	CN 216972712 U (JIANGYIN NALI NEW MATERIAL TECHNOLOGY CO., LTD.) 15 July 2022 (2022-07-15) embodiments, and figure 1	1-7
Y	CN 211872119 U (SHENZHEN HAIHAN NEW ENERGY TECHNOLOGY CO., LTD.) 06 November 2020 (2020-11-06) description, paragraphs [0029]-[0053], and figure 1	7

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

\* Special categories of cited documents:

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“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

“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

“&amp;” document member of the same patent family

Date of the actual completion of the international search

19 July 2023

Date of mailing of the international search report

21 July 2023

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Form PCT/ISA/210 (second sheet) (July 2022)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2023/083518

C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 2021164474 A1 (SHENZHEN HAIHAN NEW ENERGY TECHNOLOGY CO., LTD.) 26 August 2021 (2021-08-26) specific embodiments, and figure 1	7
A	WO 2021249230 A1 (SHENZHEN HAIHAN NEW ENERGY TECHNOLOGY CO., LTD.) 16 December 2021 (2021-12-16) entire document	1-7
A	CN 216039879 U (CHONGQING JIMAT NEW MATERIAL TECHNOLOGY CO., LTD.) 15 March 2022 (2022-03-15) entire document	1-7
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INTERNATIONAL SEARCH REPORT  
Information on patent family members

International application No.

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CN 215947437 U	04 March 2022	None	
CN 216972712 U	15 July 2022	None	
CN 211872119 U	06 November 2020	None	
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WO 2021249230 A1	16 December 2021	None	
CN 216039879 U	15 March 2022	CN 113930820 A	14 January 2022
KR 20080079963 A	02 September 2008	None	

Form PCT/ISA/210 (patent family annex) (July 2022)