MOPPING MEMBER, MOPPING APPARATUS, CLEANING ROBOT, AND CONTROL METHOD FOR CLEANING ROBOT

[0001] Cross reference to related applications

[0002] The present disclosure is the National Stage of International Application No. PCT/CN2019/101589, filed on August 20, 2019, which claims the benefit of Chinese Patent Application No. 201810987148.7, filed August 28, 2018 with the China National Intellectual Property Administration and entitled “MOPPING MEMBER, MOPPING APPARATUS, AND CLEANING ROBOT”, the entirety of which is hereby incorporated herein by reference for all purposes.

[0003] TECHNICAL FIELD

[0004] The present disclosure relates to the technical field of cleaning equipment, and more particularly relates to a mopping member, a mopping apparatus, a cleaning robot, and a control method for a cleaning robot.

[0005] BACKGROUND

[0006] The statement herein is merely used to provide background information related to the present disclosure, and is not intended to constitute the related art.

[0007] As the cleaning field has been developed, more various types of cleaning equipment are available. Many types of cleaning equipment adopt a circular double turntable structure for cleaning, namely, by rotating two mops for cleaning. However, due to processing errors, it is difficult to make the two mops tangent to each other without leaving a gap therebetween. If the mops are relatively small, there generally exists a gap therebetween; if the mops are relatively large, the mops typically squeeze and deform each other, resulting in a gap therebetween. The above-mentioned gap disables the existing cleaning equipment to remove all dust or dirt from an area to be clean at one time. Hence, many types of cleaning equipment must clean the area to be clean several times, so as to remove all the dust or dirt from the area to be clean.

[0008] SUMMARY

[0009] It is an object of the present disclosure to provide a mopping member, a mopping apparatus, a cleaning robot, and a control method for the cleaning robot, aiming to solve the problem that the existing cleaning equipment cannot remove all dust or dirt from the area to be cleaned at one time.

[0010] In one aspect, the present disclosure provides a mopping member, used for a cleaning robot to mop and clean a floor surface, including a first mop and a second mop; the

provided in a fifth embodiment of the present disclosure.

[0030] FIG. 12 is a schematic diagram of a first output shaft and a second output shaft of the mopping drive mechanism of the cleaning robot provided in the fifth embodiment.

[0031] FIG. 13 is a schematic diagram of a mopping apparatus of the cleaning robot provided in the fifth embodiment.

[0032] DETAILED DESCRIPTION OF THE EMBODIMENTS

[0033] The realizing of the aim, functional characteristics and advantages of the present disclosure are further described in detail with reference to the accompanying drawings and the embodiments. It will be appreciated that the specific embodiments described herein are merely illustrative of the present disclosure and are not intended to limit the present disclosure.

[0034] First embodiment

[0035] Please refer to FIGS. 1 to 8, the mopping member provided in the first embodiment of the present disclosure, used for a cleaning robot to mop and clean a floor surface, includes a first mop 1a and a second mop 2a. The first mop 1a is provided with a first rotating center O1, and the second mop 2a is provide with a second rotating center O2. A distance between the first rotating center O1 and the second rotating center O2 is a rotating center distance. The rotating center distance is a length of a connection line L between the first rotating center O1 and the second rotating center O2. Hereinafter, the connection line between the first rotating center O1 and the second rotating center O2 is referred to as a rotating center connection line L for short.

[0036] In the first embodiment, the first mop 1a and the second mop 1b are substantially triangular-like.

[0037] As shown in FIG. 1, the first mop 1a includes first long-diameter edges 101a and first short-diameter edges 102a that are connected via first endpoints 103a. The distance from any point on the first long-diameter edge 101a to the first rotating center O1 is greater than half of the rotating center distance, and the distance from any point on the first short-diameter edge 102a to the first rotating center O1 is less than half of the rotating center distance. The distance from the first endpoint 103a to the first rotating center O1 is equal to half of the rotating center distance.

[0038] The second mop 2a includes second long-diameter edges 201a and second short-diameter edges 202a that are connected via second endpoints 203a. The distance from any point on the second long-diameter edge 201a to the second rotating center O2 is greater than half of the rotating center distance, and the distance from any point on the second short-diameter edge 202a to the second rotating center O2 is less than half of the rotating center distance. The distance from the second endpoint 203a to the second rotating center O2 is equal to half of the

time by the first long-diameter edge 101a of the first mop 1a or the second long-diameter edge 201a of the second mop 2a that rotates to the gap later.

[0046] FIG. 7 is a schematic diagram of the mopping member provided by the first embodiment, where the width of the gap between the first mop and the second mop is 0, and the first mop 1a and the second mop 2a interfere with each other by squeezing each other. The condition that the gap between the first mop 1a and the second mop 2a is 0 and there exists the interference is generally caused by the processing errors. However, in operation, the first mop 1a and the second mop 2a with relatively large sizes due to the processing errors can also cover the uncleaned area therebetween at one time. In addition, as shown in FIG. 8, with the first mop 1a and the second mop 2a having large processing sizes, when the cleaning robot performs the mop self-cleaning at a base station 3, the self-cleaning of the sides of the first mop 1a and the second mop 2a can be realized by the interference between the first mop 1a and the second mop 2a. In FIGS. 7 and 8, the interference area is indicated by GS. As shown in FIG. 8, the base station 3 is provided with cleaning ribs 301, which enhances the cleaning effect of the mops.

[0047] Generally, a mechanism is provided for scraping the long-diameter edges and the short-diameter edges of the mops, so as to clean the sides of the mops. However, since the rotation speeds of the mops are high, and a difference between the length of the long-diameter edge and the length of the short-diameter edge is large, the mechanism needs to have a certain deformability and a certain scratch resistance, which results in excessive cost or short life of the mechanism.

[0048] In the embodiment of the present disclosure, the rotation speed of the first mop 1a is the same as the rotation speed of the second mop 2a, the distance from a contact point of the two mops to the first rotating center is different from the distance from the contact point to the second rotating center. For example, the long-diameter edge of one mop is in contact with the short-diameter edge of the other mop. In this case, different linear speeds are generated when the two mops are in contact with each other, thereby producing a speed difference. This helps to improve the cleaning effect. Accordingly, it is a reasonable cleaning approach to use the interference due to the squeezing between the first mop 1a and the second mop 2a for the self-cleaning of the sides.

[0049] In this way, when the first mop and the second mop are self-cleaning at the base station, in case where the sizes of the first mop and the second mop are relatively large, there exists the interference area when they are rotated at the same speed. For example, the long-diameter edge of one mop and the short-diameter edge of the other mop interfere with each other due to the squeezing between the two mops. As such, different linear speeds are produced when they are in contact, which produces the speed difference, thereby realizing the

endpoints to the midpoint, and the distance from a point on the first short-diameter edge 102b to the first rotating center O1 gradually decreases as the point moves from either of two endpoints to the midpoint.

[0063] The second mop 2b includes a plurality of (here, four) same second long-diameter edges 201b and a plurality of (here, four) same second short-diameter edges 202b. The plurality of second long-diameter edges 201b and the plurality of second short-diameter edges 202b are alternately connected. The distance from a point on the second long-diameter edge 201b to the first rotating center O1 gradually increases as the point moves from either of two endpoints to the midpoint, and the distance from a point on the second short-diameter edge 202b to the first rotating center O1 gradually decreases as the point moves from either of two endpoints to the midpoint.

[0064] The mopping member in the second embodiment has the same function as that of the mopping member in the first embodiment. The specific implementation of the mopping member in the second embodiment may refer to the relevant description in the first embodiment. Further, the undescribed parts of the mopping member in the second embodiment may also refer to the detailed description of the mopping member in the first embodiment.

[0065] Third embodiment

[0066] Please refer to FIG. 10, the mopping member provided in the second embodiment of the present disclosure includes a first mop 1c and a second mop 2c. The first mop 1c is provided with a first rotating center O1, and the second mop 2c is provide with a second rotating center O2. A distance between the first rotating center O1 and the second rotating center O2 is a rotating center distance. The rotating center distance is a length of a connection line L between the first rotating center O1 and the second rotating center O2. Hereinafter, the connection line between the first rotating center O1 and the second rotating center O2 is referred to as a rotating center connection line L for short.

[0067] In the third embodiment, the first mop 1c and the second mop 1c are substantially oval-like.

[0068] As shown in FIG. 10, the first mop 1c includes first long-diameter edges 101c and first short-diameter edges 102c that are connected via first endpoints. The distance from any point on the first long-diameter edge 101c to the first rotating center O1 is greater than half of the rotating center distance, and the distance from any point on the first short-diameter edge 102c to the first rotating center O1 is less than half of the rotating center distance. The distance from the first endpoint to the first rotating center O1 is equal to half of the rotating center distance. The second mop 1c includes second long-diameter edges 201c and second

plurality of first inserting positions, and installing the second mop 2a at one of the plurality of second inserting positions; on the connection line between the first rotating center O1 and the second rotating center O2, the gap between the first mop 1a and the second mop 2a being formed between the first long-diameter edge 101a and the second short-diameter edge 202a, or the gap between the first mop 1a and the second mop 2a being formed between the second long-diameter edge 201a and the first short-diameter edge 102a.

[0097] In accordance with the mopping member, the mopping apparatus and the cleaning robot provided in the present disclosure, when the first mop and the second mop are rotated, the short-diameter edge of one mop corresponds to the long-diameter edge of the other mop. On the connection line between the first rotating center and the second rotating center, the gap between the first mop and the second mop is formed between the short-diameter edge of one mop and the corresponding long-diameter edge of the other mop. During the rotations of the two mops, the gap moves left and right. As such, the mops according to the embodiments, by rotating, can cover the uncleaned gap area that existed in case of using the traditional two circular mops, thereby improving the cleaning efficiency of the cleaning equipment.

[0098] The foregoing are only illustrative embodiments in accordance with the present disclosure and therefore not intended to limit the patentable scope of the present disclosure. Any equivalent structure or flow transformations that are made taking advantage of the specification and accompanying drawings of the disclosure and any direct or indirect applications thereof in other related technical fields are within the protection scope of the present disclosure.

CLAIMS

What is claimed is:

1. A mopping member, configured for a cleaning robot to mop or clean a floor surface, comprising a first mop and a second mop; wherein:

the first mop is provided with a first rotating center, and the second mop is provided with a second rotating center; a distance between the first rotating center and the second rotating center is a rotating center distance;

the first mop comprises a first long-diameter edge and a first short-diameter edge; a point where the first long-diameter edge and the first short-diameter edge are connected is a first endpoint; a distance from any point on the first long-diameter edge to the first rotating center is greater than half of the rotating center distance, and a distance from any point on the first short-diameter edge to the first rotating center is less than half of the rotating center distance; a distance from the first endpoint to the first rotating center is equal to half of the rotating center distance;

the second mop comprises a second long-diameter edge and a second short-diameter edge; a point where the second long-diameter edge and the second short-diameter edge are connected is a second endpoint; a distance from any point on the second long-diameter edge to the second rotating center is greater than half of the rotating center distance, and a distance from any point on the second short-diameter edge to the second rotating center is less than half of the rotating center distance; a distance from the second endpoint to the second rotating center is equal to half of the rotating center distance;

in a case that the first mop and the second mop are rotated, on a connection line between the first rotating center and the second rotating center, a gap between the first mop and the second mop is formed between the first long-diameter edge and the second short-diameter edge, or formed between the second long-diameter edge and the first short-diameter edge.

2. The mopping member according to claim 1, wherein:

a side contour of the first mop and a side contour of the second mop are of a same shape;

the first long-diameter edge is one of a plurality of same first long-diameter edges of the first mop, and the first short-diameter edge is one of a plurality of same first short-diameter edges of the first mop; the plurality of first long-diameter edges and the plurality of first short-diameter edges are alternately connected; a distance from a point on the first long-diameter edge to the first rotating center gradually increases as the point moves from either of two endpoints to a midpoint of the first long-diameter edge, and a distance from a

point on the first short-diameter edge to the first rotating center gradually decreases as the point moves from either of the two endpoints to a midpoint of the first short-diameter edge; and

the second long-diameter edge is one of a plurality of same second long-diameter edges of the second mop, and the second short-diameter edge is one of a plurality of same second short-diameter edges of the second mop; the plurality of second long-diameter edges and the plurality of second short-diameter edges are alternately connected; a distance from a point on the second long-diameter edge to the second rotating center gradually increases as the point moves from either of two endpoints to a midpoint of the second long-diameter edge, and a distance from a point on the second short-diameter edge to the second rotating center gradually decreases as the point moves from either of the two endpoints to a midpoint second short-diameter edge.

3. The mopping member according to claim 2, wherein:

the first long-diameter edge is an arc-shaped edge convex about the first rotating center, and the first short-diameter edge is a straight edge or an arc-shaped edge convex about the first rotating center; and

the second long-diameter edge is an arc-shaped edge convex about the second rotating center, and the second short-diameter edge is a straight edge or an arc-shaped edge convex about the second rotating center.

4. A mopping apparatus, comprising a first turntable, a second turntable, and a mopping member; wherein:

a side edge of the first turntable and a side edge of the second turntable are configured to be spaced apart;

the mopping member comprises a first mop and a second mop;

the first mop is provided with a first rotating center, and the second mop is provided with a second rotating center; a distance between the first rotating center and the second rotating center is a rotating center distance;

the first mop comprises a first long-diameter edge and a first short-diameter edge; a point where the first long-diameter edge and the first short-diameter edge are connected is a first endpoint; a distance from any point on the first long-diameter edge to the first rotating center is greater than half of the rotating center distance, and a distance from any point on the first short-diameter edge to the first rotating center is less than half of the rotating center distance; a distance from the first endpoint to the first rotating center is equal to half of the rotating center

distance;

the second mop comprises a second long-diameter edge and a second short-diameter edge; a point where the second long-diameter edge and the second short-diameter edge are connected is a second endpoint; a distance from any point on the second long-diameter edge to the second rotating center is greater than half of the rotating center distance, and a distance from any point on the second short-diameter edge to the second rotating center is less than half of the rotating center distance; a distance from the second endpoint to the second rotating center is equal to half of the rotating center distance;

in a case that the first mop and the second mop are rotated, on a connection line between the first rotating center and the second rotating center, a gap between the first mop and the second mop is formed between the first long-diameter edge and the second short-diameter edge, or formed between the second long-diameter edge and the first short-diameter edge;

the first mop is fixedly connected to a bottom of the first turntable, and is configured to rotate with the first turntable; the second mop is fixedly connected to a bottom of the second turntable, and is configured to rotate with the second turntable; a rotation axis of the first turntable is configured to pass through the first rotating center, and a rotation axis of the second turntable is configured to pass through the second rotating center.

5. The mopping apparatus according to claim 4, wherein:

a side contour of the first turntable is configured to fall within a side contour of the first mop; and

a side contour of the second turntable is configured to fall within a side contour of the second mop.

6. The mopping apparatus according to claim 4, wherein:

a side contour of the first mop and a side contour of the second mop are of a same shape;

the first long-diameter edge is one of a plurality of same first long-diameter edges of the first mop, and the first short-diameter edge is one of a plurality of same first short-diameter edges of the first mop; the plurality of first long-diameter edges and the plurality of first short-diameter edges are alternately connected; a distance from a point on the first long-diameter edge to the first rotating center gradually increases as the point moves from either of two endpoints to a midpoint of the first long-diameter edge, and a distance from a point on the first short-diameter edge to the first rotating center gradually decreases as the point moves from either of the two endpoints to a midpoint of the first short-diameter edge; and

the second long-diameter edge is one of a plurality of same second long-diameter edges of the second mop, and the second short-diameter edge is one of a plurality of same second short-diameter edges of the second mop; the plurality of second long-diameter edges and the plurality of second short-diameter edges are alternately connected; a distance from a point on the second long-diameter edge to the second rotating center gradually increases as the point moves from either of two endpoints to a midpoint of the second long-diameter edge, and a distance from a point on the second short-diameter edge to the second rotating center gradually decreases as the point moves from either of the two endpoints to a midpoint of the second short-diameter edge.

7. The mopping apparatus according to claim 4 or 6, wherein:

the first long-diameter edge is an arc-shaped edge convex about the first rotating center, and the first short-diameter edge is a straight edge or an arc-shaped edge convex about the first rotating center;

the second long-diameter edge is an arc-shaped edge convex about the second rotating center, and the second short-diameter edge is a straight edge or an arc-shaped edge convex about the second rotating center.

8. A cleaning robot, comprising a mopping drive mechanism and a mopping apparatus;

wherein the mopping apparatus comprises a first turntable, a second turntable, and a mopping member;

a side edge of the first turntable and a side edge of the second turntable are configured to be spaced apart;

the mopping member comprises a first mop and a second mop;

the first mop is provided with a first rotating center, and the second mop is provided with a second rotating center; a distance between the first rotating center and the second rotating center is a rotating center distance;

the first mop comprises a first long-diameter edge and a first short-diameter edge; a point where the first long-diameter edge and the first short-diameter edge are connected is a first endpoint; a distance from any point on the first long-diameter edge to the first rotating center is greater than half of the rotating center distance, and a distance from any point on the first short-diameter edge to the first rotating center is less than half of the rotating center distance; a distance from the first endpoint to the first rotating center is equal to half of the rotating center distance;

the second mop comprises a second long-diameter edge and a second short-diameter edge; a point where the second long-diameter edge and the second short-diameter edge are connected is a second endpoint; a distance from any point on the second long-diameter edge to the second rotating center is greater than half of the rotating center distance, and a distance from any point on the second short-diameter edge to the second rotating center is less than half of the rotating center distance; a distance from the second endpoint to the second rotating center is equal to half of the rotating center distance;

in a case that the first mop and the second mop are rotated, on a connection line between the first rotating center and the second rotating center, a gap between the first mop and the second mop is formed between the first long-diameter edge and the second short-diameter edge, or formed between the second long-diameter edge and the first short-diameter edge;

the first mop is fixedly connected to a bottom of the first turntable, and is configured to rotate with the first turntable; the second mop is fixedly connected to a bottom of the second turntable, and is configured to rotate with the second turntable; a rotation axis of the first turntable is configured to pass through the first rotating center, and a rotation axis of the second turntable passes through the second rotating center;

driven by the mopping drive mechanism, the first turntable and the first mop are rotatable with respect to a chassis of the cleaning robot around the rotation axis of the first turntable, and the second turntable and the second mop are rotatable with respect to the chassis of the cleaning robot around the rotation axis of the second turntable.

9. The cleaning robot according to claim 8, wherein:

the mopping drive mechanism comprises a first output shaft and a second output shaft;

a lower end of the first output shaft is connected to a position where is a rotating center of the first turntable, and a lower end of the second output shaft is connected to a position where is a rotating center position of the second turntable;

an axis of the first output shaft is configured to coincide with the rotation axis of the first turntable, and an axis of the second output shaft is configured to coincide with the rotation axis of the second turntable.

10. The cleaning robot according to claim 9, wherein:

the first turntable is provided with a first shaft sleeve adapted for the first output shaft; the first output shaft is detachably inserted in the first shaft sleeve; an outer peripheral surface of the first output shaft and an inner wall surface of the first shaft sleeve are configured to limit

each other, to limit a relative rotation of the first output shaft and the first shaft sleeve; and

the second turntable is provided with a second shaft sleeve adapted for the second output shaft; the second output shaft is detachably inserted in the second shaft sleeve; an outer peripheral surface of the second output shaft and an inner wall surface of the second shaft sleeve are configured to limit each other, to limit a relative rotation of the second output shaft and the second shaft sleeve.

11. The cleaning robot according to claim 10, wherein:

there are a plurality of first inserting positions for the first output shaft and the first shaft sleeve, to allow the first turntable and the first mop to have a plurality of first installation positions with respect to the chassis of the cleaning robot, and there are a plurality of second inserting positions for the second output shaft and the second shaft sleeve, to allow the second turntable and the second mop to have a plurality of second installation positions with respect to the chassis of the cleaning robot, so that the first mop and the second mop is allowed to be at a target relative installation position;

in a case that the first mop and the second mop are at the target relative installation position, on the connection line between the first rotating center and the second rotating center, the gap between the first mop and the second mop is formed between the first long-diameter edge and the second short-diameter edge, or formed between the second long-diameter edge and the first short-diameter edge.

12. The cleaning robot according to claim 10, wherein:

the first mop after a rotation is configured to coincide in shape with itself before the rotation in a case that the first mop rotates through a preset angle;

the second mop after a rotation is configured to coincide in shape with itself before the rotation in a case that the second mop rotates through a preset angle;

there are a plurality of first inserting positions for the first output shaft and the first shaft sleeve, and a rotation angle between adjacent first inserting positions is N times the preset angle; and

there are a plurality of second inserting positions for the second output shaft and the second shaft sleeve, and a rotation angle between adjacent second inserting positions is N times the preset angle;

wherein N is a positive integer.

13. A cleaning robot, comprising a mopping drive mechanism and a mopping apparatus;

wherein the mopping apparatus comprises a mopping member; the mopping member comprises a first mop and a second mop;

the first mop is provided with a first rotating center, and the second mop is provided with a second rotating center; a distance between the first rotating center and the second rotating center is a rotating center distance;

the first mop comprises a first long-diameter edge and a first short-diameter edge; a distance from any point on the first long-diameter edge to the first rotating center is greater than half of the rotating center distance, and a distance from any point on the first short-diameter edge to the first rotating center is less than half of the rotating center distance;

the second mop comprises a second long-diameter edge and a second short-diameter edge; a distance from any point on the second long-diameter edge to the second rotating center is greater than half of the rotating center distance, and a distance from any point on the second short-diameter edge to the second rotating center is less than half of the rotating center distance;

the first mop and the second mop are driven to rotate by the mopping drive mechanism; a gap between the first mop and the second mop is formed between the first long-diameter edge and the second short-diameter edge, or formed between the second long-diameter edge and the first short-diameter edge.

14. The cleaning robot according to claim 13, wherein the mopping apparatus further comprises a first turntable and a second turntable;

a side edge of the first turntable and a side edge of the second turntable are configured to be spaced apart;

the first mop is fixedly connected to a bottom of the first turntable, and is configured to rotate with the first turntable;

the second mop is fixedly connected to a bottom of the second turntable, and is configured to rotate with the second turntable; and

driven by the mopping drive mechanism, the first turntable and the first mop are rotatable with respect to a chassis of the cleaning robot around the rotation axis of the first turntable, and the second turntable and the second mop are rotatable with respect to the chassis of the cleaning robot around the rotation axis of the second turntable.

15. The cleaning robot according to claim 14, wherein the mopping drive mechanism comprises a first output shaft and a second output shaft;

the first turntable is provided with a first shaft sleeve; the first output shaft is configured to insert in the first shaft sleeve and limit the first shaft sleeve, to limit a relative rotation of the first output shaft and the first shaft sleeve; and

the second turntable is provided with a second shaft sleeve; the second output shaft is configured to insert in the second shaft sleeve and limit the second shaft sleeve, to limit a relative rotation of the second output shaft and the second shaft sleeve.

16. The cleaning robot according to claim 15, wherein:

an outer peripheral surface of the first output shaft and an inner wall surface of the first shaft sleeve are configured to limit each other; and

an outer peripheral surface of the second output shaft and an inner wall surface of the second shaft sleeve are configured to limit each other.

17. The cleaning robot according to claim 15, wherein:

a position of the first shaft sleeve is adjustable relative to the first output shaft, to allow a position of the first mop is adjustable relative to the chassis of the cleaning robot, and a position of the second shaft sleeve is adjustable relative to the second output shaft, to allow a position of the second mop is adjustable relative to the chassis of the cleaning robot, so that the gap between the first mop and the second mop is formed between the first long-diameter edge and the second short-diameter edge, or formed between the second long-diameter edge and the first short-diameter edge.

18. The cleaning robot according to claim 15 or 17, wherein:

the first mop after a rotation is configured to coincide in shape with itself before the rotation in a case that the first mop rotates through a preset angle;

the second mop after a rotation is configured to coincide in shape with itself before the rotation in a case that the second mop rotates through a preset angle;

there are a plurality of first inserting positions for the first output shaft and the first shaft sleeve, and a rotation angle between adjacent first inserting positions is N times the preset angle; and

there are a plurality of second inserting positions for the second output shaft and the second shaft sleeve, and a rotation angle between adjacent second inserting positions is N times the preset angle;

wherein N is a positive integer.

19. A control method for a cleaning robot, applied to the cleaning robot according to claim 8 or 14, comprising:

driving, by the mopping drive mechanism, the first turntable and the first mop to rotate with respect to the chassis of the cleaning robot around the rotation axis of the first turntable, and driving the second turntable and the second mop to rotate with respect to the chassis of the cleaning robot around the rotation axis of the second turntable;

wherein, in a case that the mopping drive mechanism drives the first turntable and the second turntable to rotate, the first turntable and the second turntable are controlled to rotate at opposite rotating directions and at a same rotating speed, and during the rotation, the gap between the first mop and the second mop is always formed between a long-diameter edge and a short-diameter edge.

20. The control method according to claim 19, wherein:

the mopping drive mechanism comprises a first output shaft and a second output shaft;

the first turntable is provided with a first shaft sleeve adapted for the first output shaft; the first output shaft is detachably inserted in the first shaft sleeve, an outer peripheral surface of the first output shaft and an inner wall surface of the first shaft sleeve are configured to limit each other, to limit a relative rotation of the first output shaft and the first shaft sleeve;

the second turntable is provided with a second shaft sleeve adapted for the second output shaft; the second output shaft is detachably inserted in the second shaft sleeve, an outer peripheral surface of the second output shaft and an inner wall surface of the second shaft sleeve are configured to limit each other, to limit a relative rotation of the second output shaft and the second shaft sleeve; and

before the operation of in a case that the mopping drive mechanism drives the first turntable and the second turntable to rotate, the control method further comprises:

there being a plurality of first inserting positions for the first output shaft and the first shaft sleeve, and there being a plurality of second inserting positions for the second output shaft and the second shaft sleeve;

installing the first mop at one of the plurality of first inserting positions, and installing the second mop at one of the plurality of second inserting positions, so that on the connection line between the first rotating center and the second rotating center, the gap between the first mop and the second mop is formed between the first long-diameter edge and the second short-diameter edge, or formed between the second long-diameter edge and the first short-diameter edge.