



**We claim:**

1. A method for determining mail path information, comprising:

determining, via a device applying a geographic information system (GIS) map, a latitude-longitude coordinate range of each collector-distributor point based on a collection and distribution range of the collector-distributor point,

acquiring a latitude-longitude coordinate of a sending point of a piece of mail;

determining, based on the latitude-longitude coordinate range to which the latitude-longitude coordinate of the sending point belongs, a collector-distributor point to which the sending point of the mail is subordinate;

acquiring a latitude-longitude coordinate of a destination point of the piece of mail;

determining, based on a latitude-longitude coordinate range to which the latitude-longitude coordinate of the destination point belongs, a collector-distributor point to which the destination point of the mail is subordinate;

acquiring collector-distributor point information of the collector-distributor point to which the sending point is subordinate and collector-distributor point information of the collector-distributor point to which the destination point is subordinate, where the collector-distributor point information of the collector-distributor point to which the sending point is subordinate records the level of the collector-distributor point to which the sending point is subordinate and collector-distributor points in each level which are superordinate to the collector-distributor point to which the sending point is subordinate, and the collector-distributor point information of the collector-distributor point to which the destination point is subordinate records the level of the collector-distributor point to which the destination point is subordinate and collector-distributor points in each level which are superordinate to the collector-distributor point to which the destination point is subordinate; and

determining, based on the collector-distributor point information of the

collector-distributor point to which the sending point is subordinate and the collector-distributor point information of the collector-distributor point to which the destination point is subordinate, each halfway collector-distributor point that the piece of mail needs to reach and path information of the piece of mail.

2. The method as claimed in claim 1, wherein the process of determining, based on the collector-distributor point information of the collector-distributor point to which the sending point is subordinate and the collector-distributor point information of the collector-distributor point to which the destination point is subordinate, each halfway collector-distributor point that the piece of mail needs to reach and path information of the piece of mail comprises:

extracting, from the collector-distributor point information of the collector-distributor point to which the sending point is subordinate, collector-distributor points in each level which are superordinate to the collector-distributor point to which the sending point is subordinate as initial sending-side halfway collector-distributor points; and extracting, from the collector-distributor point information of the collector-distributor point to which the destination point is subordinate, collector-distributor points in each level which are superordinate to the collector-distributor point to which the destination point is subordinate as initial destination-side halfway collector-distributor points;

determining, from the initial sending-side halfway collector-distributor points, a collector-distributor point with a highest level as a current sending-side halfway collector-distributor point; and determining, from the initial destination-side halfway collector-distributor points, a collector-distributor point with a highest level as a current destination-side halfway collector-distributor point;

judging whether the current sending-side halfway collector-distributor point is the current destination-side halfway collector-distributor point;

removing the current sending-side halfway collector-distributor point from the initial sending-side halfway collector-distributor points; removing the current destination-side halfway collector-distributor point from the initial destination-side

halfway collector-distributor points; and returning to the process of determining, from the initial sending-side halfway collector-distributor points, a collector-distributor point with a highest level as a current sending-side halfway collector-distributor point; and determining, from the initial destination-side halfway collector-distributor points, a collector-distributor point with a highest level as a current destination-side halfway collector-distributor point, in a case that the current sending-side halfway collector-distributor point is the current destination-side halfway collector-distributor point;

determining the remaining initial sending-side halfway collector-distributor points as target sending-side halfway collector-distributor points; and determining the remaining initial destination-side halfway collector-distributor points as target destination-side halfway collector-distributor points, in a case that the current sending-side halfway collector-distributor point is not the current destination-side halfway collector-distributor point;

determining the target sending-side halfway collector-distributor points and the target destination-side halfway collector-distributor points as the halfway collector-distributor points that the piece of mail needs to reach; and

connecting the collector-distributor point to which the sending point is subordinate, the halfway collector-distributor points, and the collector-distributor point to which the destination point is subordinate in an order of the collection-distribution path, to form the path information of the piece of mail, where the order of the collection-distribution path is: the collector-distributor point to which the sending point is subordinate, the target sending-side halfway collector-distributor points in an ascending order of the level, the target destination-side halfway collector-distributor points in a descending order of the level, and the collector-distributor point to which the destination point is subordinate.

3. The method as claimed in claim 1, wherein the process of acquiring a latitude-longitude coordinate of a sending point of a piece of mail comprises:

acquiring address information of the sending point of the piece of mail; and

invoking a geographic information system (GIS) map to find the latitude-longitude coordinate of the sending point based on the address information of the sending point; or

acquiring a first latitude-longitude coordinate by a positioning device of a satellite positioning system at the sending point of the piece of mail; and using the first latitude-longitude coordinate as the latitude-longitude coordinate of the sending point;

and accordingly the process of acquiring a latitude-longitude coordinate of a destination point of the piece of mail includes:

acquiring address information of the destination point of the piece of mail; and invoking a geographic information system (GIS) map to find the latitude-longitude coordinate of the destination point based on the address information of the destination point; or

acquiring a second latitude-longitude coordinate by another positioning device of the satellite positioning system at the destination point of the piece of mail; and using the second latitude-longitude coordinate as the latitude-longitude coordinate of the destination point.

4. A method for sorting mail at a collector-distributor point, comprising: acquiring path information of each piece of mail determined in advance by using the method as claimed in any one of claim 1 to claim 3; and for the piece of mail, using the collector-distributor point to which the sending point is subordinate and the halfway collector-distributor points recorded in the path information as current sorting collector-distributor points, establishing, for each current sorting collector-distributor point, a correspondence between the piece of mail and a target collector-distributor point corresponding to the piece of mail at the current sorting collector-distributor point as a sorting correspondence, where the target collector-distributor point of the piece of mail at the current sorting collector-distributor point is a next collector-distributor point to the current sorting collector-distributor point recorded in the path information of the piece of mail at the current sorting collector-

distributor point,

wherein the method comprises, at any one of the current sorting collector-distributor points:

using the pieces of mail at the current sorting collector-distributor point as current sorting pieces of mail, and acquiring sorting correspondences of the current sorting pieces of mail at the current sorting collector-distributor point;

determining target collector-distributor points of the current sorting pieces of mail based on the sorting correspondences of the current sorting pieces of mail; and

sorting the current sorting pieces of mail with different target collector-distributor points into different mail sorting sets in accordance with a sorting rule, where the current sorting pieces of mail in the same mail sorting set has a same target collector-distributor point.

5. A method for labeling delivery information of a collector-distributor point, comprising: acquiring path information of a piece of mail determined in advance by using the method as claimed in any one of claim 1 to claim 3; and using the collector-distributor point to which the destination point is subordinate recorded in the path information of the piece of mail as a current delivering collector-distributor point,

wherein the method comprises, at the current delivering collector-distributor point:

labeling the latitude-longitude coordinate of the destination point of the piece of mail in the latitude-longitude coordinate range of the current delivering collector-distributor point on the GIS map.

6. A device for determining mail path information, comprising:

a collector-distributor point coordinate range module configured to determine, via a device applying a geographic information system (GIS) map, a latitude-longitude coordinate range of each collector-distributor point based on a collection

and distribution range of the collector-distributor point;

a sending point coordinate acquiring module configured to acquire a latitude-longitude coordinate of a sending point of a piece of mail;

a module for determining a collector-distributor point to which a sending point is subordinate configured to determine, based on the latitude-longitude coordinate range to which the latitude-longitude coordinate of the sending point belongs, a collector-distributor point to which the sending point of the mail is subordinate;

a destination point coordinate acquiring module configured to acquire a latitude-longitude coordinate of a destination point of the piece of mail;

a module for determining a collector-distributor point to which a destination point is subordinate configured to determine, based on the latitude-longitude coordinate range to which the latitude-longitude coordinate of the destination point belongs, a collector-distributor point to which the destination point of the piece of mail is subordinate;

a collector-distributor point information acquiring module configured to acquire collector-distributor point information of the collector-distributor point to which the sending point is subordinate and collector-distributor point information of the collector-distributor point to which the destination point is subordinate, where the collector-distributor point information of the collector-distributor point to which the sending point is subordinate records the level of the collector-distributor point to which the sending point is subordinate, and collector-distributor points in each level which are superordinate to the collector-distributor point to which the sending point is subordinate, and the collector-distributor point information of the collector-distributor point to which the destination point is subordinate records the level of the collector-distributor point to which the destination point is subordinate, and collector-distributor points in each level which are superordinate to the collector-distributor point to which the destination point is subordinate; and

a path information determining module configured to determine, based on the collector-distributor point information of the collector-distributor point to which the

sending point is subordinate and the collector-distributor point information of the collector-distributor point to which the destination point is subordinate, each halfway collector-distributor point that the piece of mail needs to reach, and path information of the piece of mail.

7. The device as claimed in claim 6, wherein the path information determining module comprises:

an initial sending halfway point extracting sub-module configured to extract, from the collector-distributor point information of the collector-distributor point to which the sending point is subordinate, collector-distributor points in each level which are superordinate to the collector-distributor point to which the sending point is subordinate as initial sending-side halfway collector-distributor points;

an initial destination halfway point extracting sub-module configured to extract, from the collector-distributor point information of the collector-distributor point to which the destination point is subordinate, collector-distributor points in each level which are superordinate to the collector-distributor point to which the destination point is subordinate as initial destination-side halfway collector-distributor points;

a current halfway point determining sub-module configured to determine, from the initial sending-side halfway collector-distributor points, a collector-distributor point with a highest level as a current sending-side halfway collector-distributor point; and determine, from the initial destination-side halfway collector-distributor points, a collector-distributor point with a highest level as a current destination-side halfway collector-distributor point;

a current halfway point judging sub-module configured to judge whether the current sending-side halfway collector-distributor point is the current destination-side halfway collector-distributor point;

an initial halfway point removing sub-module configured to remove the current sending-side halfway collector-distributor point from the initial sending-



side halfway collector-distributor points; remove the current destination-side halfway collector-distributor point from the initial destination-side halfway collector-distributor points; and start the current halfway point determining sub-module, in a case that the current halfway point judging sub-module judges that the current sending-side halfway collector-distributor point is the current destination-side halfway collector-distributor point;

a target halfway point determining sub-module configured to determine the remaining initial sending-side halfway collector-distributor points as target sending-side halfway collector-distributor points; and determine the remaining initial destination-side halfway collector-distributor points as target destination-side halfway collector-distributor points, in a case that the current halfway point judging sub-module judges that the current sending-side halfway collector-distributor point is not the current destination-side halfway collector-distributor point;

a halfway collector-distributor point determining sub-module configured to determine the target sending-side halfway collector-distributor points and the target destination-side halfway collector-distributor points as the halfway collector-distributor points that the piece of mail needs to reach; and

a mail path connecting sub-module configured to connect the collector-distributor point to which the sending point is subordinate, the halfway collector-distributor points, and the collector-distributor point to which the destination point is subordinate in an order of the collection-distribution path, to form the path information of the piece of mail, wherein the order of the collection-distribution path is: the collector-distributor point to which the sending point is subordinate, the target sending-side halfway collector-distributor points in an ascending order of the level, the target destination-side halfway collector-distributor points in a descending order of the level, and the collector-distributor point to which the destination point is subordinate.

8. The device as claimed in claim 6, wherein the sending point coordinate acquiring module comprises:

a sending address acquiring sub-module configured to acquire address information of the sending point of the piece of mail; and

a sending coordinate finding sub-module configured to find the latitude-longitude coordinate of the sending point on a GIS map based on the address information of the sending point; or

a sending coordinate positioning sub-module configured to acquire a first latitude-longitude coordinate by a positioning device of a satellite positioning system at the sending point of the mail; and

a sending coordinate determining sub-module configured to use the first latitude-longitude coordinate as the latitude-longitude coordinate of the sending point;

and the destination point coordinate acquiring module includes:

a destination address acquiring sub-module configured to acquire address information of the destination point of the piece of mail; and

a destination coordinate finding sub-module configured to find the latitude-longitude coordinate of the destination point on the GIS map based on the address information of the destination point; or

a destination coordinate positioning sub-module configured to acquire a second latitude-longitude coordinate by a positioning device of a satellite positioning system at the destination point of the piece of mail; and

a destination coordinate determining sub-module configured to use the second latitude-longitude coordinate as the latitude-longitude coordinate of the destination point.

9. A system for sorting mail at a collector-distributor point, comprising:

a path information acquiring unit configured to acquire path information of a piece of mail determined in advance by using the device as claimed in any one of claim 6 to claim 8;

a sorting correspondence establishing unit configured to, using the collector-distributor point to which the sending point is subordinate and the halfway collector-distributor points recorded in the path information for each piece of mail as current sorting collector-distributor points, establish, for each current sorting collector-distributor point, a correspondence between the piece of mail a target collector-distributor point corresponding to the piece of mail at the current sorting collector-distributor point as a sorting correspondence, where the target collector-distributor point of the piece of mail at the current sorting collector-distributor point is a next collector-distributor point to the current sorting collector-distributor point recorded in the path information of the piece of mail at the current sorting collector-distributor point;

a sorting correspondence acquiring unit configured to, at any one of the current sorting collector-distributor points, use the pieces of mail at the current sorting collector-distributor point as current sorting pieces of mail, and acquire the sorting correspondences of the current sorting pieces of mail at the current sorting collector-distributor point;

a target collector-distributor point determining unit configured to use the pieces of mail at the current sorting collector-distributor point as current sorting pieces of mail, and determine target collector-distributor points of the current sorting pieces of mail based on the sorting correspondences of the current sorting pieces of mail; and

a sorting unit configured to sort the current sorting pieces of mail with different target collector-distributor points into different mail sorting sets in accordance with a sorting rule, wherein the current sorting pieces of mail in the same mail sorting set has a same target collector-distributor point.

10. A system for labeling delivery information of a collector-distributor point, comprising:

a path information acquiring unit configured to acquire path information of a piece of mail determined in advance by using the device as claimed in any one of

claim 6 to claim 8; and use the collector-distributor point to which the destination point is subordinate recorded in the path information of the piece of mail as a current delivering collector-distributor point; and

a destination point labeling unit configured to label the latitude-longitude coordinate of the destination point of the piece of mail within the latitude-longitude coordinate range of the current delivering collector-distributor point on the GIS map.

Dated this 14<sup>th</sup> day of October 2015

A handwritten signature in black ink, appearing to read "Sonali Mewar", with a long horizontal stroke extending to the right.

**SONALI MEWAR**  
**Of K & S PARTNERS**  
**ATTORNEY FOR THE APPLICANT(S)**  
**IN/PA-2739**  
***Digitally signed and filed through E-filing***