banknote loading platform. According to this disclosure, it is said that it is possible to smoothly accommodate a newly transported banknote while efficiently pressing a banknote already loaded on the banknote loading platform irrespective of the dimension in the width direction of the banknote without increasing the number of components and increasing the size.

In this type of banknote accommodating container (the collection container), if the distance between the push-in rotating bodies is set to be wide to match with the width of a banknote with the maximum size, a banknote with a narrower width can be easily displaced in the width direction between the supporting concave portions or drop from the supporting concave portions, and it is therefore impossible to accommodate banknotes on a loading platform to be well aligned with each other by using the push-in rotating bodies only. Therefore, by providing the push-in member and rotating the push-in rotating bodies while the center in the width direction of the banknote is pushed in irrespective of the dimension in the width direction, it is possible to transfer the banknote onto the loading platform while maintaining a receiving posture and a positional relation before the banknote is pushed in.

[0005] However, in Patent Literature 1, a timing of a reciprocating operation of the push-in member, particularly a time (a time period) during which the push-in member continues to press the banknote against the banknote loading platform depends only on a rotation period of first driven gears integrated with the push-in rotating bodies. Therefore, a time during which the push-in member continues to stay at a push-in position at which the push-in member protrudes most cannot be sufficiently ensured. According to operation drawings in Patent Literature 1, the time

during which the push-in member continues to stay at the push-in position is within a time period in which each push-in rotating body rotates by about 45 degrees (or an angle equal to or smaller than 45 degrees). Therefore, in most of a time after the push-in member leaves the banknote, pressing of the banknote by the push-in rotating bodies only is continued. However, the push-in rotating bodies are in contact with the banknote while pressing the banknote and rotating in order to return to their original positions. Therefore, the push-in rotating bodies can easily displace the banknote on the loading platform in the width direction. That is, if pressing of the banknote only by the outer circumferential surfaces of the push-in rotating bodies that continue to rotate in a time period during which the banknote is not sandwiched and pressed between the push-in member and the banknote loading platform, is performed for a long time, the banknote on the loading platform can be easily displaced by being led by rotation of either one of the push-in rotating bodies. In this manner, the push-in member that has pressed the banknote once retreats in a short time, and in most of a time after the retreat, the push-in rotating bodies are in contact with the banknote while rotating. Therefore, it is apparent that erroneous loading such as displacement of the banknote or drop of the banknote when the banknote is transferred can easily occur.

[0006] Further, because the push-in rotating bodies are in contact with the banknote surface while pressing the banknote surface and rotating, also during the period during which the push-in member presses the banknote against the loading platform, displacement or drop of the banknote on the loading platform can easily occur.

Furthermore, the circumferential length of the outer

stability of an operation on the other end portion side during pressing is low, easily causing play or vibration in an operation of the push-in member or lowering the durability of a mechanism that guides the push-in member.

These problems occur not only in the banknote collection container but also in a paper sheet collection container of a paper sheet accommodating apparatus that handles paper sheets other than banknotes, such as tickets, cash vouchers, and securities.

Citation List

Patent Literature

[0009] Patent Literature 1: Japanese Patent Application Laid-open No. 2016-212676

Summary

Technical Problem

[0010] The present invention has been achieved in view of the above problems, and an object of the invention is to provide a paper sheet accommodating unit configured to press a center of a paper sheet such as a banknote, by a pressing member arranged between a pair of rotating bodies arranged in parallel to and to be close to each other, and to transfer the paper sheet onto a paper sheet loading platform while supporting both edges of the paper sheet by recesses respectively formed by cutting in circumferential surfaces of the rotating bodies, and to prevent erroneous transfer onto the paper sheet loading platform by ensuring a long time during which the pressing member pushes in the paper sheet alone, make receiving of a paper sheet stable by ensuring a sufficiently large opening width of the recess, prevent the rotating bodies from becoming large by increasing the depth of the recess in accordance with the

entire length in the long-edge direction of the pressing member.

Brief Description of Drawings

[0013] [FIGS. 1] FIGS. 1(a) and (b) are a front view and an A-A cross-sectional view of a paper sheet (banknote) processing device according to an embodiment of the present invention.

[FIGS. 2] FIGS. 2(a) and (b) are perspective views of a back-side appearance and a front-side appearance of a paper sheet (banknote) accommodating unit according to the embodiment of the present invention.

[FIG. 3] FIG. 3 is a side cross-sectional view taken along a line B-B in FIG. 2(a).

[FIG. 4] FIG. 4 is a back-side perspective cross-sectional view taken along the line B-B.

[FIG. 5] FIG. 5 is a front-side perspective cross-sectional view taken along the line B-B.

[FIG. 6] FIG. 6 is a plan cross-sectional view taken along a line C-C in FIG. 2(b).

[FIG. 7] FIG. 7 is a plan-side perspective cross-sectional view taken along the line C-C.

[FIG. 8] FIG. 8 is a perspective view illustrating a configuration example of a drive mechanism that causes a rotating body and a pressing member to work together.

[FIG. 9] FIG. 9 is a partially omitted diagram illustrating a state of attachment of a cam member in the drive mechanism in FIG. 8.

[FIGS. 10] FIGS. 10(a) to (e) are diagrams that explain a procedure in which a pantograph mechanism and rotating bodies operate in accordance with progress of rotation of a cam member in order.

[FIGS. 11] FIGS. 11(f) to (k) are diagrams that

explain a procedure in which a pantograph mechanism and rotating bodies operate in accordance with progress of rotation of the cam member in order.

[FIGS. 12] FIGS. 12(a) and (b) are explanatory diagrams of a depositing operation and a confirming operation of the banknote processing device.

[FIGS. 13] FIGS. 13(a) and (b) are explanatory diagrams of a dispensing operation and a collecting operation of the banknote processing device.

Description of Embodiments

[0014] The present invention will be described below in detail with an embodiment illustrated in the drawings.

FIGS. 1(a) and (b) are a front view and an A–A cross-sectional view of a paper sheet (banknote) processing device according to an embodiment of the present invention. FIGS. 2(a) and (b) are perspective views of a back-side appearance and a front-side appearance of a paper sheet (banknote) accommodating unit according to the embodiment of the present invention. FIG. 3 is a side cross-sectional view taken along a line B–B in FIG. 2(a). FIG. 4 is a back-side perspective cross-sectional view taken along the line B–B. FIG. 5 is a front-side perspective cross-sectional view taken along the line B–B. FIG. 6 is a plan cross-sectional view taken along a line C–C in FIG. 2(b). FIG. 7 is a plan-side perspective cross-sectional view taken along the line C–C. FIG. 8 is a perspective view illustrating a configuration example of a drive mechanism that causes a rotating body and a pressing member to work together. FIG. 9 is a partially omitted diagram illustrating a state of attachment of a cam member in the drive mechanism in FIG. 8.

Although the present embodiment describes a device

[0038] In FIG. 10(e), the cam member further pivots more than in the state in (d) by 15 degrees, that is, by 90 degrees in total in the counterclockwise direction, and the respective rotating bodies 120 and 130 also further pivot by 15 degrees in the banknote leaving directions. Therefore, the postures of the recesses 120a and 130a of the respective rotating bodies become perpendicular to the loading surface 200a, so that both ends of the banknote can leave further easily. Although the other end portion 186d of the first link piece is located to be close to a leading end portion of the arc-shaped outer peripheral edge 187b of the cam member in (d), it further rides on the outer peripheral edge in (e). By the further pivotal movement of the cam member by 15 degrees, the first link piece and the second link piece protrude (extend) forward slightly, so that the pressing surface 140b of the pressing member slightly protrudes more than in the state in (d). In other words, it is possible to finely adjust the protrusion length of the pressing member by adjusting the shape of the outer peripheral edge 187b of the cam member as appropriate. In the present embodiment, the protrusion length in the stage in (e) and the subsequent stages is set to be larger than the protrusion length in the stage in (d). In the stage in (e) and the subsequent stages, the outer peripheral edges 124a and 134a of the contact pieces of the respective rotating bodies are separated from the loading surface. Therefore, the pressing member 140 maintains a state where it presses the banknote loading platform 200 alone via the banknote B.

The above descriptions related to the shape of the outer peripheral edge 187b of the cam member are merely examples. The shape of the outer peripheral edge 187b may be set in such a manner that the protrusion length of the