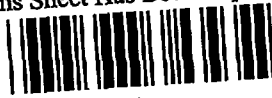


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**MACHINE FOR COUNTING AND CONTROLLING BANKNOTES FOR
PERFORMING AUTOMATIC DEPOSITS**

BACKGROUND OF THE INVENTION

The present invention relates to a machine for counting and controlling banknotes, which has been specifically designed for performing automatic deposits.

As is known, a very important problem in the bank automatizing field is that of designing a machine adapted to count and control banknotes supplied to the machine even in a random arrangement.

Prior banknote counting machines, on the other hand, have not been found to satisfactorily solve the above mentioned problem, since said prior machines have been specifically designed for counting and controlling banknotes of an individual size, which must be supplied to the machine in an ordered arrangement.

Moreover, prior machines designed for counting different size and arrangement banknotes, have not been found as reliable, since they are frequently subjected to failures caused by erroneous banknote supplying operations.

SUMMARY OF THE INVENTION

Accordingly, the aim of the present invention is to provide a machine for counting and controlling banknotes, in a fully automatic manner, said banknotes having any size and being randomly arranged, even in an overlapping configuration.

Within the scope of the above mentioned aim, a main object of the present invention is to provide a very reliable machine which can be used for performing automatic banknote deposits, with a direct
5 crediting on the user current account.

Another object of the present invention is to provide such a machine allowing the supplied banknotes to be returned to the user as the operation of the machine fails or as the latter accepts only
10 partially the operations to be performed, while rejecting a portion of the banknotes.

Yet another object of the present invention is to provide such a machine which is very reliable and safe in operation.

15 According to one aspect of the present invention, the above mentioned aim and objects, as well as yet other objects, which will become more apparent hereinafter, are achieved by a machine for counting and controlling banknotes, characterized in
20 that said machine comprises: a banknote supplying station; a pulling unit arranged downstream of said banknote supplying station and operating on individual banknotes, along a direction substantially perpendicular to the longitudinal extension of a said
25 banknote; a banknote conveyor unit, for conveying said banknotes along a direction substantially parallel to the longitudinal extension of said banknotes, to a banknote counting and controlling station, driving a banknote switching device, for
30 selectively supplying said banknotes to a counted banknote collection zone and to a rejected banknote collection zone.

According to an advantageous aspect of the



present invention, at the outlet of said pulling unit is arranged an abutment element, defining a reference bearing abutment for a longitudinal edge of the banknote driven by the pulling unit and, at said outlet abutment element are arranged conveyor means of said conveyor unit, which can be controllably engaged or disengaged with/from the banknote abutted against the outlet abutment element; said pulling unit and conveyor unit being reversably driven for reconveying the banknote to the banknote supplying station, as a jam of said machine occurs.

BRIEF DESCRIPTION OF THE DRAWINGS

Further characteristics and advantages of the machine according to the present invention will become more apparent hereinafter from the following detailed disclosure of a preferred, though not exclusive, embodiment thereof which is illustrated, by way of an indicative, but not limitative, example, in the accompanying drawings, where:

Figure 1 is schematic front perspective view illustrating the machine according to the present invention;

Figure 2 is a further front perspective view illustrating the banknote supplying unit;

Figure 3 is a schematic cross-sectional view of Figure 2 substantially taken along the section line III-III;

Figure 4 is a side perspective view of the banknote supplying station;

Figure 5 is a perspective view illustrating the banknote supplying station, seen from the rear thereof;



Figure 6 is a perspective view illustrating a detail of the machine related to the banknote conveyor unit;

Figure 7 is a further perspective view illustrating the banknote conveyor means of the banknote conveyor unit, arranged at an outlet abutment element, provided at the outlet of the banknote pulling unit;

Figure 8 is a further perspective view illustrating a driving assembly for driving the conveyor means of the conveyor unit;

Figure 9 is a schematic view illustrating the banknote switching device;

Figure 10 is a further perspective view illustrating the banknote collecting zone for collecting the counted banknotes;

Figure 11 is a schematic cross-sectional view illustrating the box for the counted banknotes;

Figure 12 illustrates said counted banknote box as perspective view from the top thereof; and

Figure 13 is a perspective view illustrating the slider elements associated with the counted banknote box.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

With reference to the number references of the above mentioned figures, the banknote processing machine according to the present invention, which has been generally indicated by the reference number 1, comprises a supporting framework 2, which can be provided with any desired suitable covering element.

The banknote processing machine comprises a

banknote supplying station, indicated generally by the reference number 3, which is provided with a slanted plane 4, laterally delimited by a pair of sidewalls 5a and 5b and, at the front thereof, i.e. at the terminal part of said slanted plane 4, by a front portion 6, which can be controllably turned about a rotary axis 7, parallel to the slanted plane 4 and spaced from the top thereof.

Through said slanted plane 4 two slot rows 8 and 9 are defined, therefrom rollers 10 and 11 project. More specifically, starting from the open front side of the slanted plane 4, an eccentric roller row 10 is provided, said eccentric rollers being mounted on the same shaft 10a, and a banknote supplying roller row 11 being moreover provided, the rollers whereof are mounted on a roller mounting shaft 11a which is parallel to the shaft 10a supporting the eccentric rollers 10.

At one end of the shaft 11a supporting the banknote supplying rollers 11, is connected a gear wheel 12, meshing with a further gear wheel 13, of larger diameter, which is rotatively driven about its rotary axis by a driving motor, preferably a step by step electric motor, as shown in Figure 6.

At the other end portion of the shaft 11a supporting the banknote supplying rollers 11, is provided a pulley 14, therewith a toothed belt 15 engages, said toothed belt coupling said pulley 14 to a further pulley 16 which is rotatably supported about its rotary axis by a wall 17 fixed to the framework 2.

The toothed belt 15, in particular, is moreover entrained on a pulley 18 operating as a belt

tensioning element.

The pulley 16 is coupled, through a coupling belt 19, to a further pulley 20 which is connected to one end of the shaft 10a supporting the
5 eccentric rollers 10.

Said belt 19 rotatively entrains or drives a further pulley 21, for driving yet other elements of the machine, which will be disclosed in a more detailed manner hereinafter, and being moreover
10 entrained on a transmitting pulley 22.

The front wall 6 can swing about a swinging axis 7, by a motor, preferably of a step-by-step type, not shown for simplicity, which has its outlet shaft coupled to an eccentric cam 23, affecting one
15 end portion of a lever 24 in turn connected, at the opposite end thereof, to the wall 6, as is schematically shown in Figure 3.

Upon turning the eccentric cam 23, the wall 6 can be brought from a closure position, at which it
20 frontally closes the banknote supply station 3, to a partially opened position, and to a fully opened position, as it will be disclosed in a more detailed manner hereinafter.

On the side of said wall 6 opposite to the zone including the rollers 10 and 11, a pulling unit
25 25 is arranged, specifically designed for driving or entraining the individual banknotes 100, coming from the banknote supplying station 3, along a direction substantially perpendicular to the longitudinal
30 extension of said banknote.

More specifically, the driving unit 25 comprises a slanted plane 26, constituting an extension of said slanted plane 4, through which,

immediately downstream of the wall 6, is defined a slot 27, therefrom a bottom pulling or driving roller 28 projects, on the top of said roller being provided a friction roller 29, for holding the banknotes 100
5 on the top of the bottom driving roller 28, in order to allow a single banknote, among the banknotes coming from the banknote supplying station 3, to pass between said rollers 28 and 29, upon partially opening the wall 6.

10 Downstream the mentioned rollers 28 and 29, on the top of the slanted plane 26, a feeding roller 30 is arranged.

Downstream of said banknote feeding roller 30 a banknote locating or positioning roller 31 is
15 arranged, said banknote positioning roller projecting from a suitable slot formed through the slanted plane 26.

Immediately downstream of said banknote locating roller 31, the slanted plane 26 is
20 delimited, at the front thereof, by an outlet or output abutment element 32, defining a reference bearing abutment for a longitudinal edge of the banknote 100 driven by the driving or pulling unit 25.

25 The roller 28 is provided with a shaft at one end of which is affixed said pulley 16, whereas the banknote feeding roller 30 is mounted on a shaft at one end of which is coupled said pulley 21, as clearly shown in Figure 4.

30 From said Figure 4 it should be apparent that the rollers 28 and 30 are driven by the same motor driving the eccentric rollers 10 and the banknote supplying rollers 11.

The banknote locating or positioning roller 31, on the contrary, is mounted on a shaft to one end of which a pulley 35 is connected, said pulley 35 being further coupled, through a coupling belt 36, to a pulley 37 mounted on the output shaft of a further electric motor, also preferably of the step-by-step type, and not shown for simplicity.

On the top of that zone of the slanted plane 26 which is arranged near the outlet or output abutment element 32, is arranged the starting portion of a conveyor unit, specifically designed for conveying individual banknotes 100 along a direction substantially parallel to the longitudinal extension of said banknotes, to bring said banknotes to a banknote counting and controlling station 40.

The latter operates a banknote switching device 41, arranged adjoining the banknote conveyor unit, for selectively switching the banknotes 100 conveyed by said banknote conveyor unit, to a counted banknote collecting zone 42 or to a rejected banknote collecting zone 43, as it will be disclosed in a more detailed manner hereinafter.

More specifically, the banknote conveyor unit comprises starting conveyor means, which are substantially constituted by three pulleys 44, 45 and 46, as shown in Figures 6 and 7, on which is entrained a belt 47 having the bottom leg thereof facing the slanted plane 26, near the outlet abutment element 32.

The pulleys 45 and 46 are mounted on a plate 48 which can be controllably driven or displaced in order to cause the bottom leg of said belt 47 to move toward or from the slanted plane 26,

to engage or disengage said belt 47 with/from the banknote 100 conveyed by the banknote conveyor unit 25 against the outlet abutment element 32.

The plate 48, in particular, is coupled to
5 an arm 49 which, in turn, is connected to a toothed sector 50, clearly shown in Figure 8 which is swingably supported by the framework 2, to swing about a swinging axis 51, and which meshes with a gear wheel 52, driven by an electric motor,
10 preferably an electric step-by-step motor, not shown for simplicity.

In operation, the actuation of the step-by-step motor 52 will cause said pulleys 45 and 46 to be either raised or lowered in the direction of the
15 slanted plane 26.

The pulley 44, on the contrary, is a fixed pulley mounted on a shaft 53 supporting other pulleys for entraining thereon bottom conveyor belts, indicated by the reference number 55.

20 The top belts 55, in particular, are faced, near the banknote counting and controlling station 40, to bottom conveyor belts 56, so as to individually convey the banknotes 100 coming from the slanted plane 26, the through the banknote counting
25 and controlling station 40.

At the outlet of said banknote counting and controlling station 40 are moreover provided: a top conveyor belt 60 and a bottom conveyor belt 61 which, for a length of their extension, starting from the
30 outlet of said banknote counting and controlling station 40, are mutually overlapping, so as to receive the banknotes 100 coming from said banknote counting and controlling station 40 therebetween and

to convey said banknotes to the banknote switching device 41 which, as stated, is driven by the banknote counting and controlling station 40.

The top conveyor belt 60 is entrained at one end thereof about an entrainment pulley 62, arranged on the top of the banknote collecting zone 43, whereas the bottom conveyor belt 61, at the outlet of the banknote switching device 41, faces for a portion of the extension thereof, a banknote taking belt 63, up to a banknote taking wheel 64.

The banknote switching device 41, driven by said station 40, as said station detects an unacceptable banknote passing therethrough, is displaced and arranged against the bottom conveyor belt 61, thereby practically clearing the downward directed path, in the direction of the rejected banknote collecting zone 43. Vice versa, if the station 40 detects an acceptable banknote, then the switching device 41 is driven to allow said banknote to pass between the bottom conveyor belt 61 and the banknote taking belt 63, thereby conveying said banknote to said banknote taking wheel 64, as is clearly shown in Figure 9.

The banknote taking wheel 64 comprises a pair of flanges, which are spaced from one another and are provided with spirally arranged recesses 65, designed for defining individual banknote loading spaces, for loading said banknotes coming engaged between the banknote taking belt 63 and the bottom conveyor belt 61.

The banknote taking wheel 64, in particular, is adapted to abut against a reference abutment 66, allowing the banknotes to disengage from

the spiral recesses 65, thereby causing said banknote to fall to the banknote collecting zone 42.

The latter can comprise a front wall 67, substantially vertically extending, and a rear wall 5 68, substantially horizontally extending, as said walls are arranged in their closure positions.

The walls 67 and 68 can swing, as clearly shown in Figure 11, to be arranged to a closed position in which the banknotes 100, coming from said 10 banknote collecting zone 42, are accumulated on the rear wall 68, or to an opened position, where the front wall 67 is inwardly turned and the rear wall 68 is upwardly turned, thereby providing a free communication toward a conveying hopper 80, adapted 15 to supply the banknote 100 to a removable underlaying banknote collecting box 81.

The walls 67 and 68 are driven by step-by-step motors 82 and 83.

The hopper 80, as is shown in Figures 11 20 and 13, is coupled to C-shape longitudinal beams 84, which slidably receive the banknote collecting box 81.

The banknote collecting box 81, is provided with a top shutter element 85, which can be 25 wound/unwound by a winding/unwinding roller 86, supported by one end of the banknote collecting box 81.

Moreover, automatic closing means are provided, for automatically closing said shutter 85, 30 as the banknote collecting box 81 is removed.

Said automatic closing means comprise a closing roller 87, supported by said C-shape longitudinal beam 84 and being provided with

eccentric projections 88 engaging with closing projections 89, defined at the end portions of the shutter 85 edge.

The latter, in turn, is provided with a
5 central coupling element 90, arranged correspondingly to a closing electric valve 91, provided on the banknote collecting box 81 frame, and operating for holding the shutter 85 in the closing position thereof, after having made the connection.

10 In operation, as the banknote collecting box 81 is removed, the projections 89 will engage with the eccentric projections 88 of the closing roller 87.

Thus, the shutter 85 will be pulled to its
15 closed position, to allow the central coupling element 90 to be connected to the electric valve 91.

For removing the banknote collecting box 81, it is necessary that the roller 87 and, in particular, the eccentric projections 88 thereof, be
20 disengaged from the closing projections 89.

To that end a sensor roller 92 engaging with an edge of the banknote collecting box 81 is provided, said sensing roller 92 being connected, through a lever 93, to the roller 87.

25 At the end of the banknote collecting box removal, the sensing roller 92 can turn, thereby disengaging from the banknote collecting box 81 and, accordingly, also the roller 87 can turn.

Then, the eccentric projections 88
30 disengage from the closing projections 89, thereby the banknote collecting box 81 can be fully removed.

In this connection it should be pointed out that the banknote collecting box 81, holding therein

accepted and counted banknotes, will be held in a closed condition and can be opened exclusively by electric commands, as suitably preset, and exclusively sent by authorized persons.

5 As the banknote collecting box 81 is engaged or introduced again, the shutter 85 of the latter will be opened, since it will be urged to do this by resilient return means associated with the winding roller 86 and, during the box reintroduction
10 step, the engagement between the box 81 and sensing roller 92 will cause the closing roller 87 to partially turn, thereby arranging the eccentric projections 88 in the proper position thereof, in order to close the shutter 85, as the banknote
15 collecting box 81 is withdrawn again.

 The subject machine comprises moreover pressurized air jet delivering means, said means being arranged downstream of the bottom pulling or driving roller 28 and being oriented between the
20 friction roller 29 and said bottom driving roller, in order to facilitate the banknote 100 to pass between said two rollers, during its return movement to pass from the slanted plane 26 to the slanted plane 4, with the front wall 6 being fully opened.

25 Said pressurized air jet delivery means can comprise drawer means 70, which are supplied, through supplying pipes 71, with pressurized air and which are provided, on the sides thereof facing said rollers 28 and 29, with delivery nozzles 72.

 To the foregoing it should be moreover
30 added that the conveyor belts 60 and 61 are entrained on common or shared pulleys 73 along the mutual contact portion thereof, and on respective top

pulleys 74 and bottom pulleys 75.

The banknote take belt 63, in turn, is entrained on a pulley 76, in common with the bottom conveyor belt 61, and on respective pulleys 77.

5 The machine according to the invention operates as follows.

The banknotes 100 are arranged, even in an overlapping arrangement, on the slanted plane 4 at the banknote supplying station 3.

10 The rotation of the eccentric rollers 10 and banknote supplying rollers 11 causes the banknotes to progressively advance toward the front wall 6, which will be partially opened in order to allow a reduced number of banknotes to pass
15 therethrough.

The banknotes driven at the bottom of the partially opened wall 6 will bear against the friction roller 29, holding said banknotes at the top of the bottom driving roller 28, thereby allowing an
20 individual banknote at a time to pass between said two rollers 28, 29, said individual banknote being driven by the combined operation of the rollers 28, 30 and 31 along the slanted plane 26, to be brought against the outlet abutment element 32.

25 As a banknote abuts against the outlet abutment element 32, the belt 47 will be lowered toward the slanted plane 26, thereby engaging with the banknote 100 and entraining it along a direction substantially parallel to the longitudinal extension
30 of said banknote, differently from the operation of the rollers 28, 30 and 31 which will drive the banknote 100 along a direction substantially perpendicular to the longitudinal extension of said

banknote.

Then, the banknote is entrained by the conveyor belts 55 and 56, through the banknote counting and controlling station 40, which will
5 verify said banknote and, if the banknote is acceptable, then it will count it by setting the switching device 41 for conveying the banknote to the banknote collecting zone 42, in the case of acceptable banknotes, or to the banknote collecting
10 zone 43, in the case of banknotes to be rejected.

The banknote at the outlet of the banknote counting and controlling unit 40 will be supplied to the zone between the top belt 60 and lower belt 61, to be entrained by said conveyor belts to the
15 banknote switching device 41.

As the switching device 41 is driven to reject the banknote, then the banknote will be directed toward the banknote collecting area 43, or it will be engaged between the bottom conveyor belt
20 61 and the banknote taking belt 63, to be introduced into the spiral recesses 65 of the banknote taking wheel 64.

The banknote taking wheel 64, as it is rotated, will deposit the controlled and counted
25 banknotes in the banknote collecting zone 42 against the walls 67 and 68 which will be driven to cause the banknotes to fall into the banknote collecting box 81, as disclosed.

As, during the transfer of banknotes from
30 the banknote supplying station 2 to the banknote taking wheel 64, a jam or failure occurs, then it will be possible to operate the machine so as to reverse the driving direction of the banknote

conveyor and driving means, in order to cause the banknotes 100 to return to the banknote supplying station 3.

5 In this case, the wall 6 will be rotated to a full opening position thereof, in order to facilitate the banknotes to return on the slanted plane 4 of the banknote supplying station 3.

Moreover, the drawer means 70 will be supplied by pressurized air, to cause pressurized air jets to impinge on the region between the friction roller 29 and bottom driving roller 28 to facilitate the passage of the banknotes through said rollers 28 and 29.

15 From the above disclosure and from the figures of the accompanying drawings, it should be apparent that the invention fully achieves the intended aim and objects.

In particular, the fact is to be pointed out that a banknote processing machine has been provided, which is very reliable in operation and which can be used for performing automatic deposits, with the possibility of returning supplied banknotes, as machine jams or failures occur.

25 The subject machine comprises electronic control means allowing the driving and driving speed of the banknotes to be adjusted or controlled at will, depending on the operations to be performed.

While the subject banknote processing machine has been disclosed and illustrated with reference to preferred embodiments thereof, it should be apparent that the disclosed embodiments are susceptible to several modifications and variations all of which will come within the scope of the appended claims.



CLAIMS

1. A machine for counting and controlling banknotes, characterized in that said machine comprises: a banknote supplying station; a pulling or driving unit, arranged downstream of said banknote
5 supplying station, and operating on individual banknotes along a direction substantially perpendicular to the longitudinal extension of a said banknote; a banknote conveyor unit, for conveying said banknotes along a direction substantially
10 parallel to the longitudinal extension of said banknotes, to a banknote counting and controlling station, driving a banknote switching device, provided for selectively supplying a said banknote to a counted banknote collecting zone and to a rejected
15 banknote collecting zone.

2. A machine, according to Claim 1, characterized in that, at the outlet of said banknote pulling or driving unit, is provided an outlet abutment element, defining a reference bearing
20 abutment for a longitudinal edge of said banknote driven by said pulling or driving unit; at said outlet abutment element being arranged conveyor means of said banknote conveyor unit, which can be controllably engaged with or disengaged from a
25 banknote abutting against said outlet abutment element; said pulling or driving unit and said conveyor unit being adapted to be reversely operated, for reconveying banknotes to the banknote supplying unit, as a jam of said machine occurs.

30 3. A machine, according to Claims 1 and 2, characterized in that said banknote supplying station comprises a slanted plane, delimited by side walls





and a front wall, which can swing and being adapted to be controllably driven from a closing position to an intermediate opening position, for supplying said banknotes to said pulling unit, to a full opening
5 position.

4. A machine, according to one or more of the preceding claims, characterized in that said banknote supplying station comprises eccentric rollers and banknote supplying rollers, projecting
10 from slots defined through said slanted plane and which can be driven to push said banknotes arranged on said slanted plane in the direction of said swinging front wall.

5. A machine, according to one or more of
15 the preceding claims, characterized in that said machine comprises moreover swinging means for causing said front wall to swing, said swinging means comprising a step-by-step electric motor driving an eccentric cam operating on an end portion of a lever
20 having its opposite end portion pivoted to said swinging front wall.

6. A machine, according to one or more of the preceding claims, characterized in that said pulling or driving unit comprises, downstream of said
25 swinging front wall, a bottom driving roller, thereabove a friction roller is arranged, said friction roller being adapted to hold said banknotes on the top of the bottom driving roller, in order to allow a single banknote at a time to pass between
30 said rollers.

7. A machine, according to one or more of the preceding claims, characterized in that said pulling or driving unit comprises, downstream of said





bottom driving roller, a banknote feeding roller, arranged on the top of a slanted plane bearing thereon said banknotes.

8. A machine, according to one or more of
5 the preceding claims, characterized in that said pulling or driving units comprises, downstream of said banknote feeding roller, a banknote locating roller, projecting from said slanted plane and arranged near said outlet abutment element, upstream
10 of reconveying means.

9. A machine, according to one or more of the preceding claims, characterized in that said machine comprises moreover pressurized air jet delivery means, arranged downstream of said driving
15 roller and oriented between said friction roller and driving roller in order to facilitate the passage, between said two rollers, of a said banknote during its return movement toward said banknote supplying station.

20 10. A machine, according to one or more of the preceding claims, characterized in that said conveyor means comprise a belt facing said slanted plane, near said outlet abutment element and adapted to engage said banknote between top and bottom
25 conveyor belts of said conveyor unit.

11. A machine, according to one or more of the preceding claims, characterized in that said conveyor belt of said conveyor means is entrained on a fixed pulley and on two controllably movable
30 pulleys which can be driven either towards said slanted plane or away therefrom.

12. A machine, according to one or more of the preceding claims, characterized in that said





movable pulleys are mounted on a swinging supporting plate, provided with a toothed sector meshing with a pinion driven by a step-by-step electric motor, for causing said movable pulleys to be moved either
5 toward said slanted plane or away therefrom.

13. A machine, according to one or more of the preceding claims, characterized in that said conveyor belts are adapted to supply said banknotes under said banknote counting and controlling station.

10 14. A machine, according to one or more of the preceding claims, characterized in that, at the outlet of said banknote counting and controlling station, a top conveyor belt and a bottom conveyor belt are provided, said conveyor belts having
15 overlapping shared sections thereof, for receiving the banknote at the output of said banknote counting and controlling station and ending at said banknote switching device.

15. A machine, according to one or more of
20 the preceding claims, characterized in that said banknote switching device is adapted to supply the counted and controlled banknotes on a banknote taking belt which is driven, for a preset length, on a common path with said bottom belt, to arrange said
25 banknotes on a banknote taking wheel.

16. A machine, according to one or more of the preceding claims, characterized in that said banknote taking wheel comprises a pair of spaced flanges, provided with spiral recesses, defining
30 loading spaces for loading therein individual banknote, and that a reference abutment means is provided for disengaging said banknotes from said spiral recesses.

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17. A machine, according to one or more of the preceding claims, characterized in that said counted banknote collecting zone comprises a rear swinging wall and a front swinging wall which can be arranged, respectively, at a horizontal position and a vertical position, in the closed condition thereof, and can be rotated in order to communicate the counted banknote collecting zone with a banknote collecting underlaying box.

10 18. A machine, according to one or more of the preceding claims, characterized in that said banknote collecting box is slidably housed inside C-shape longitudinal beams supporting a transport hopper, which can be arranged at a port or opening defined by said front wall and rear wall in the opening condition thereof.

19. A machine, according to one or more of the preceding claims, characterized in that said machine comprises moreover a closing roller provided with eccentric projections and supported by C-shape longitudinal beams, said eccentric projections being adapted to be removably engaged with closing projections defined on a top shutter for closing said banknote collecting box, said closing shutter being adapted to be wound and unwound by an automatic winding/unwinding roller supported by said banknote collecting box.

20. A machine, according to one or more of the preceding claims, characterized in that, on an edge of said closing shutter, a central coupling element is provided, said central coupling element being coupled to an electric valve adapted to hold said closing shutter in a stable closing position, to



allow said closing shutter to be opened exclusively by authorized persons using authorized means.

21. A banknote counting and controlling machine, according to one or more of the preceding 5 claims, and substantially as broadly disclosed and illustrated and for the intended aim and objects.



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