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(54) COIN DISTRIBUTOR FOR COIN ACTUATED MACHINES

(57) Coin returner for coin-operated machines consisting of an endless belt (1) provided with transverse transportation blades (5), whose belt connects two positions placed at different heights. The rising segment of the belt at least is surrounded by a screen defined by a front wall (7) and two side walls (8). This screen has a lower opening to receive the coins one by one and one or more upper outlets (12) limited by a trapdoor (13) which can intercept the upwards path of coins (10).

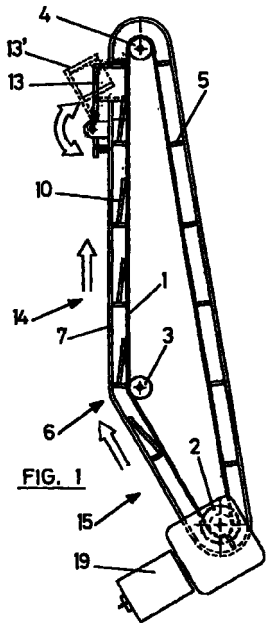

FIG. 1

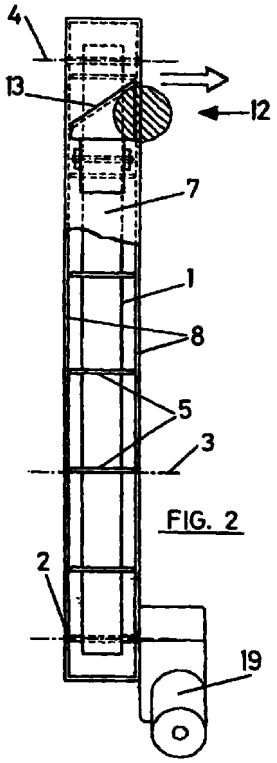

FIG. 2

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Description

[0001] The present invention relates to a coin returner for coin-operated machines, such as game machines and/or vending machines.

[0002] In machines of this type, coins which are collected or recovered arrive from one or more containers which supply the required coins according to instructions which they receive. Coins which exit the returner fall by their own weight towards the return tray or window. This forces such tray or window to be located lower than the returner, which in turn must be lower than the selector.

[0003] All of this means that the point of collection of the coins must be located in the bottom of the machine, so that generally the user will have to bend over to collect the coins.

[0004] In addition, requiring gravity for coins to pass from one device to another forces a minimum height for the machine frames.

[0005] In order to avoid these problems, returners are known which include a coin elevator consisting of a rising chute with a cross-section approximately equal to that of the coins in the container, with a lower inlet and an upper outlet located in the smaller walls. Through such lower inlet coins are admitted from the coin container, driven by a pushing device, so that each coin is pushed by the next coin along the duct, rising through it until the outlet is reached.

[0006] These returners present limits in height due to coin friction, and can also become stuck when they receive coins of different sizes.

[0007] Also known by Japanese patent no. 5-20524 is a returner which includes an endless belt inclined upwards, which the coin returner outlet faces directly. The belt is provided with transverse ribs which simplify coin transport. The coin container is provided with a mechanism which carries the coins towards the belt at a certain position. When the coins reach the upper end of the belt they pass to a second horizontal transporter.

[0008] One problem presented by the described returner is that as the elevator belt is inclined it requires a large space to be installed which may be similar to or greater than that needed for the coin returner.

[0009] Space available inside game and vending machines is limited and mechanisms should occupy as little space as possible

[0010] In addition, the returner of the described Japanese patent requires a special mechanism at the outlet of the coin returner to supply such coins to the belt in the correct position.

[0011] Finally, the inclined belt of the described returner serves only as a coin elevator, and such coins cannot be recovered and returned to the container once they are outside it.

[0012] The object of the present invention is a coin returner consisting of an endless belt which occupies a small space and allows to raise coins with respect to the outlet point of the returner. The returner of the invention also has the advantage that it can be applied to traditional construction coin returners or containers.

[0013] A further advantage of the returner of the invention is that the coins supplied by the container can return to the container or delivered for a second use.

[0014] Another advantage of the returner of the invention is that it can include means for determining the value of the different coins which may be carried by the belt as well as their position, selecting those which are to be returned and those which must return to the container, so that it can be applied to a coin container which receives and stores coins of different value.

[0015] The returner of the invention consists of an endless belt with transverse transport blades whose belt connects two points located at different heights, a lower one corresponding to the coin returner outlet and a higher one corresponding to the outlet to the collection tray.

[0016] According to the first characteristic of the invention the belt has its rising segment bordered by a screen consisting of a front wall next to the longitudinal free edge of the blades and side walls next to the adjacent belt edges. This screen is provided with a bottom opening and at least one more upper opening. The bottom opening is located in one of the side walls while the upper opening or openings can be on the side walls or on the front wall.

[0017] The bottom opening is placed opposite the coin returner outlet in order to receive coins one by one parallel to the belt. It shall be provided at least with one outlet opening on top which will be opposite the collection tray. The rising path of the coins is intercepted by a trapdoor placed even with the top opening which reroutes the coins towards the outlet opening. The trapdoor is retracted by the blades as these pass.

[0018] As the elevator belt is placed vertically, the space it occupies is minimised and it can reach a height equal to the length of the belt. The screen which encloses the rising segment of the belt on the front and sides prevents the coins from falling, ensuring that they are carried from the inlet opening to the outlet. In this way the belt can be placed vertically, at least in its rising segment, which may even have a negative slope, and thus the space occupied by the belt is minimised and a height can be reached equal to the length of said belt.

[0019] According to a further characteristic of the invention the belt may include means for identifying the value of coins carried by the blades as well as means for detecting the position of these blades, so that at all times the coins in the different position are identified by their value. In this way, as the coins reach the upper section of the belt they are re-routed towards the collection tray, returned to the coin container or sent for a second use, depending on whether or not their value agrees with that of the coins that must be returned.

[0020] For this the screen shall be provided with at least two upper openings, and the coins carried by the

belt will be selectively re-routed towards one or another of these openings.

[0021] The positional control of the transportation blades and of the coins can be obtained by using optical, magnetic, capacitance, etc. sensors. In addition, the belt drive motor may include a Gray code reader to control the revolutions of this motor.

[0022] The length of the belt will depend on the number of coins which must be carried and on the height which must be attained with respect to the coin returner outlet.

[0023] The conveyor belt will be capable of moving in either direction. By controlling the position of the coins and the motor we will know whether we need the system to turn in one sense or another, so that the system delivers the exact coins which must be returned or paid to the user.

[0024] The returner will preferably have a coin inlet detector and an outlet detector. The returner will stop when the coin outlet detector has counted the pre-set number of outlets.

[0025] These and further advantages and characteristics of the present invention will become apparent in view of the accompanying drawings, in which a non-limiting example of an embodiment is shown.

[0026] In these drawings:

Figure 1 is a side elevation of a coin returner constructed according to the invention.

Figure 2 is a front elevation of the returner of figure 1.

Figure 3 is a view similar to figure 1 of a returner with a coin identification element.

Figure 4 is a view similar to figure 3 of a returner with two upper outlets.

Figure 5 is a front elevation of the returner of figure 4.

Figures 6 and 7 are views similar to figures 1 and 2 showing an alternative construction..

Figures 8 and 9 correspond to area A of figure 6 enlarged with the trapdoor in the retracted and re-routing positions respectively.

[0027] The returner shown in figures and 2 consists of an endless belt, labelled 1 mounted between a driving roller 2 and direction changing rollers labelled 3 and 4. Endless belt 1 is provided in its transportation surface with transverse transportation blades labelled as 5.

[0028] The endless belt, at least in its rising section, is bordered by a screen consisting of a front wall 7 and side walls 8 which are next to free longitudinal edge and the transverse edges respectively of transportation blades 5.

[0029] The described screen is provided with a bottom opening placed on one of the side walls facing the coin returner outlet. The position of this lower opening is labelled as 9 in figure 5 where receipt of coins 10 from coin container 11 is shown.

[0030] The screen which surrounds the rising segment of belt 1 is also provided with at least one upper outlet opening labelled as 12. Immediately above this upper outlet 12 is a trapdoor 13 which can intercept the rising path of the coins and re-route these towards outlet 12. Trapdoor 13 is retractable so that it can adopt position 13' of figure 1 where it allows blades 5 to pass freely.

[0031] With the described construction coins 10 arriving from container 11 reach inlet 9 with each coin being carried by a blade 5 in the rising segment of the belt until outlet 12 is reached, which will be situated opposite a chute or duct which will carry the coin to the collection tray.

[0032] With the described construction rising segment 6 of the belt can be placed vertically as shown in figure 1 and labelled 14, or even with a negative slope as labelled 15 in said figure.

[0033] Figure 3 shows a construction similar to the one described with reference to figures 1 and 2 but including a coin identifying element 16 as well as an impulse generator 17 in drive roller 2 and an impulse reader 18.

[0034] By means of identifying element 16 the value of coin 10 carried by each blade 5 may be known, while by means of the impulse generator 17 and reader 18 the position of blades 5 can be known.

[0035] Drive roller 2 is driven by a micro-engine 19.

[0036] With the embodiment described in figure 5 the screen surrounding the rising segment of the belt will preferably have two upper outlets which in the example shown in figures 4 and 5 are placed at different heights and labelled 20 and 21. Directly above each of these openings is a trapdoor 22-23, similar to trapdoor 13 described with reference to figures 1 and 2. These trapdoors shall also be retractable to allow blades 5 to pass. In addition trapdoor 23 shall be activated depending on the value of coins 10 carried by the different blades 5.

[0037] When the returner starts to operate in order to return a given amount, trapdoor 23 may or may not intercept the coin which reaches outlet 20 depending on whether said coin must be returned or not, as a function of the information provided by identification element 16 and impulse generator 17 and reader 18.

[0038] In the event that the coin must be paid trapdoor 23 shall intercept it and it is re-routed towards outlet 20 which leads to the collection chute or tray. If the coin reaching the position of outlet 20 must not be paid trapdoor 23 is retracted and the coin continues to rise carried by the corresponding blade until trapdoor 22 is reached, which reroutes such coin towards outlet 21

leading to the coin container for its recovery. The coin could also be directed towards a second use or application.

[0039] In this way coins carried by blades 5 will be taken to collection outlet 20 or recovery outlet 21 depending on their value.

[0040] With this construction the returner may be installed in containers 11 holding coins of several values, the returner identifying and selecting the coins which must be paid.

[0041] With the described construction a belt 1 may be used which can move in both directions. By controlling coin positions with impulse generator 17 and reader 18 and by knowing the value of the coins using identifier 16 the system will always know in which direction to turn, all of this so that the coins which must be returned or paid to the user are delivered to outlet 20.

[0042] The returner may also be provided with a coin entry detector near inlet 9 and an outlet detector near payment outlet 20, so that the returner stops when the outlet detector counts the pre-set number of coins as decided by their value.

[0043] With the described construction a returner is obtained with which the coins are raised from the outlet of coin container 11, with the endless belt adopting a vertical position so that the space used inside the vending or game machine is reduced.

[0044] Figures 6 to 9 show an alternative construction wherein the trapdoor which can intercept the rising path of the coins, labelled as 25, moves linearly and is controlled by an electromagnet 26. Figure 8 shows trapdoor 25 in its retracted position while in figure 9 trapdoor 25' intercepts the path of the coins and reroutes them towards the outlet as shown in figure 7.

[0045] In addition, as shown in figure 7, blades 5 may have an inclined surface 5' for the coins to rest on, which facilitates their exit when trapdoor 25' intercepts their path and ensures a position of the coins which allows mounting detectors which identify their value, for example as a function of their diameter. Otherwise, this embodiment is equivalent to the one described with reference to figures 1 to 4.

Claims

1. Coin returner for coin-operated machines, consisting of an endless belt (1) provided with transverse transportation blades (5) whose belt connects two positions at different heights, a lower one which corresponds to the coin returner outlet and a higher one which corresponds to the outlet to the collection tray, characterised in that the above mentioned belt (1), at least in its rising segment which is surrounded by a screen consisting of a front wall (7) near the free longitudinal edge of the blades and of two side walls (8) near the adjacent edges of the belt, such screen being provided with a lower opening (9) made in one of the side walls (8), in a position opposite the coin returner outlet in order to receive coins (10) one by one in position parallel to belt (1), and also provided with at least one upper outlet (12, 20) which reaches a position opposite the outlet leading to the collection belt, directly above which is a trapdoor (13, 23) which may intercept the rising path of coins (10) and re-route them towards said outlet, with this trapdoor retractable upon passing of the blades (5).

2. Coin returner as in claim 1, characterised in that it includes means of identification (16) of the value of coins (10) carried by blades (5), and means (18) for detecting the position of blades (5) and coins (10).

3. Coin returner as in claim 1, characterised in that the screen has two upper outlets (20, 21) towards one of which coins (10) carried by blades (5) are selectively routed, one of outlets (20, 21) corresponding to the exit towards the collection tray while the other recovers coins (10) for the returner or sends them towards a second use.

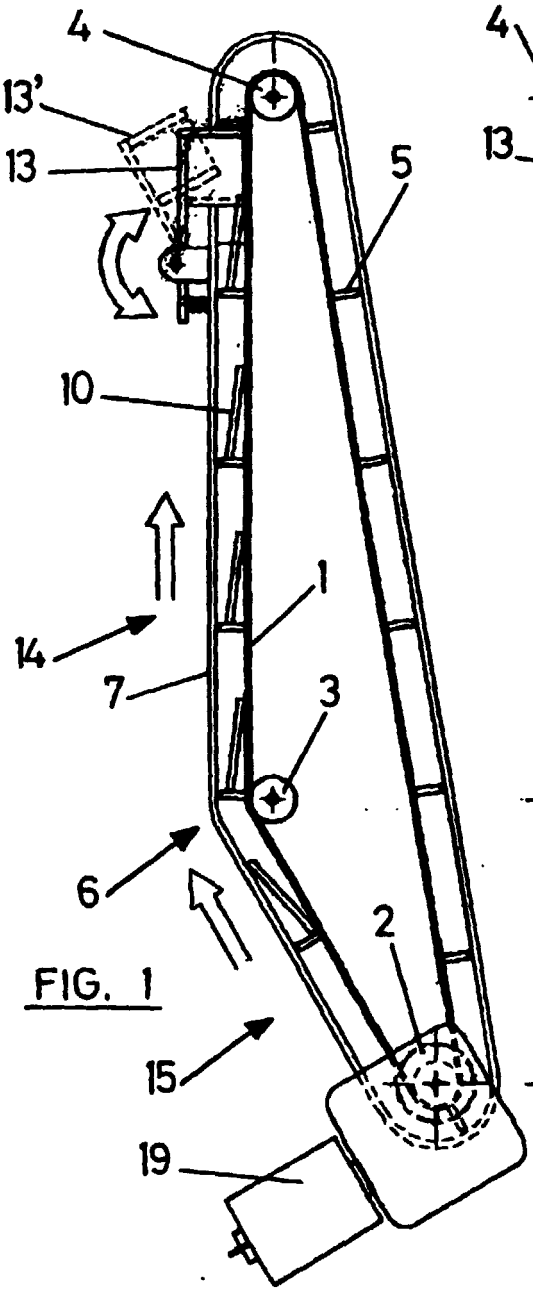


FIG. 1

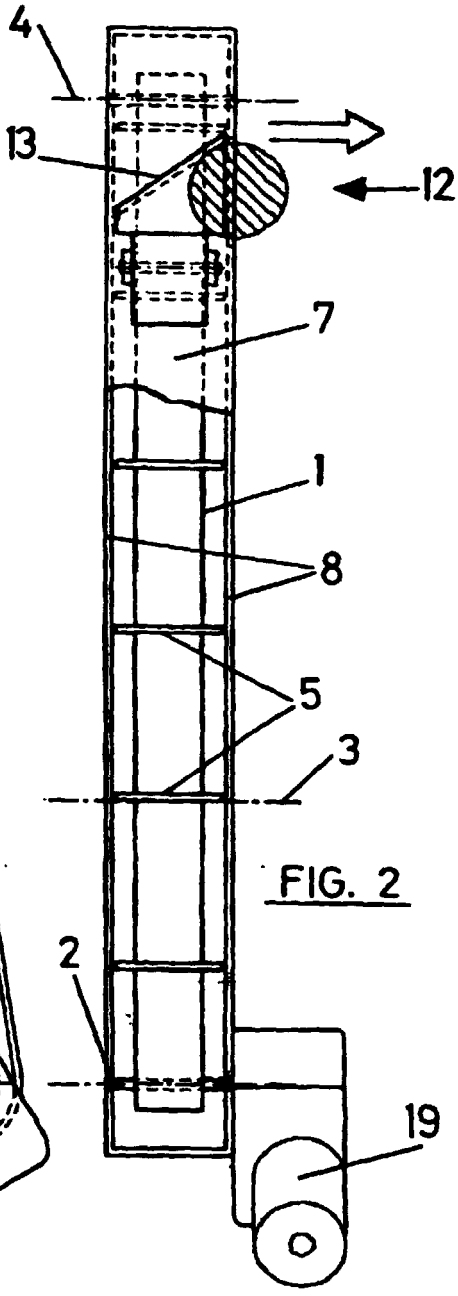


FIG. 2

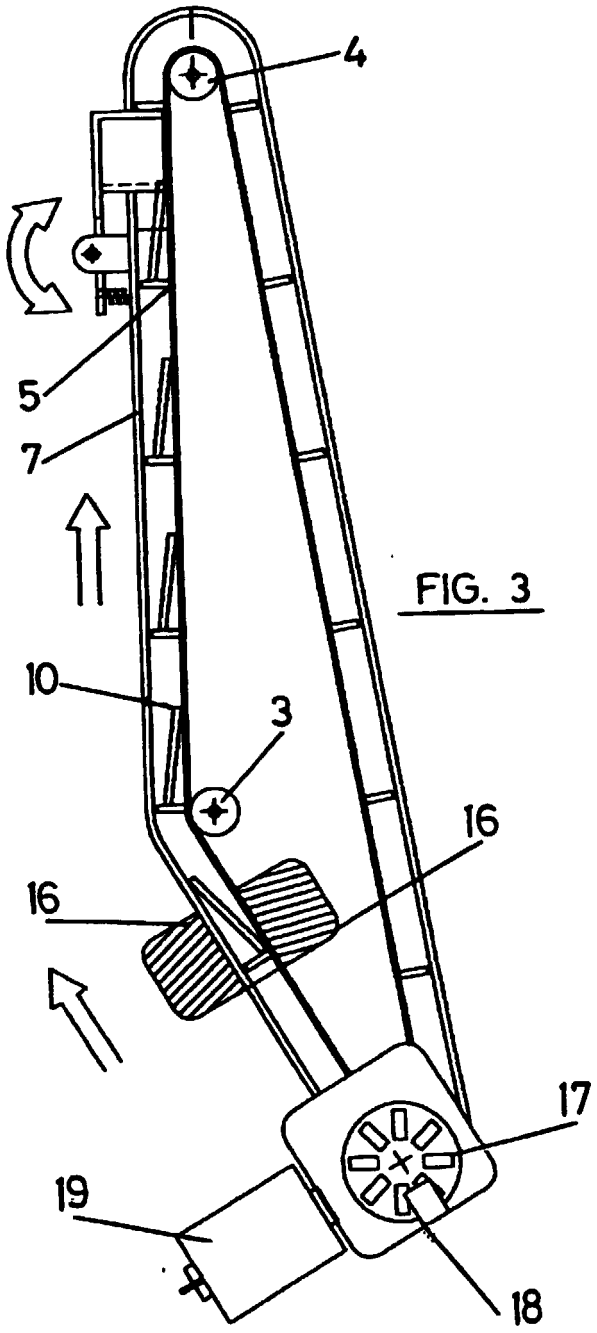


FIG. 3

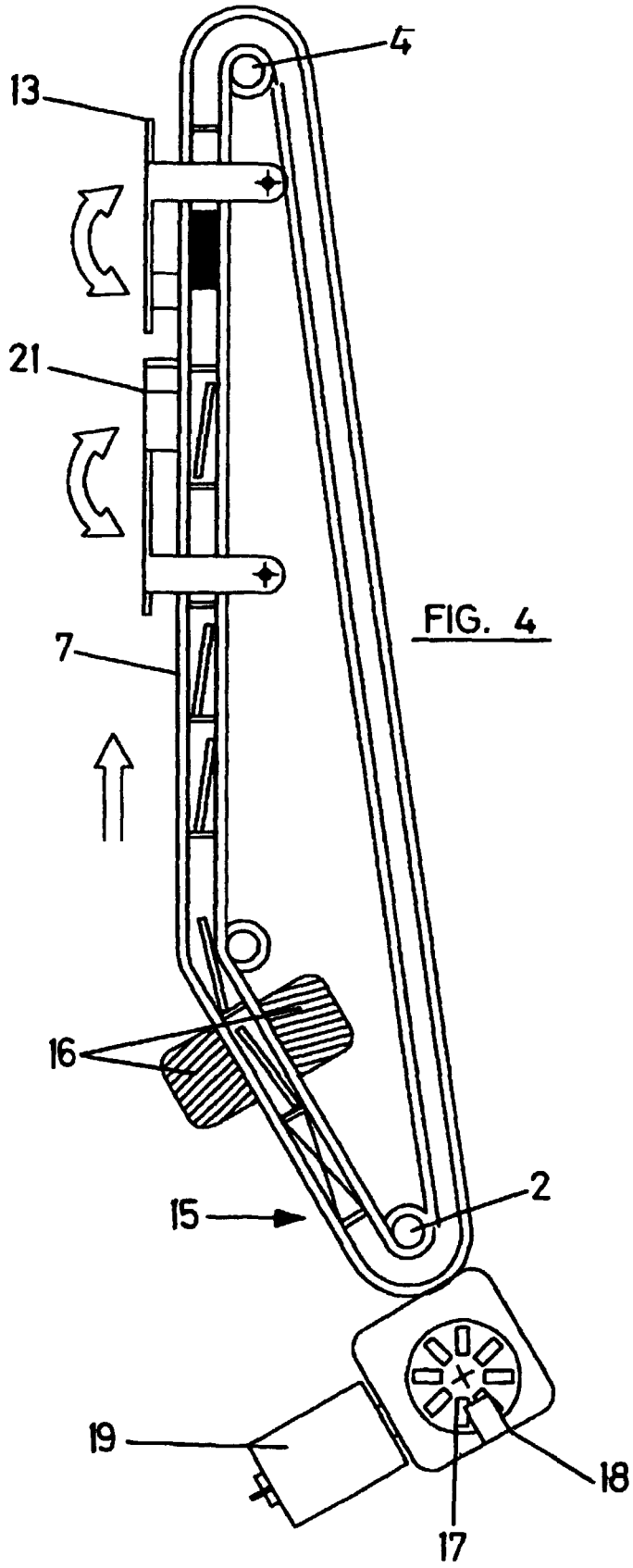
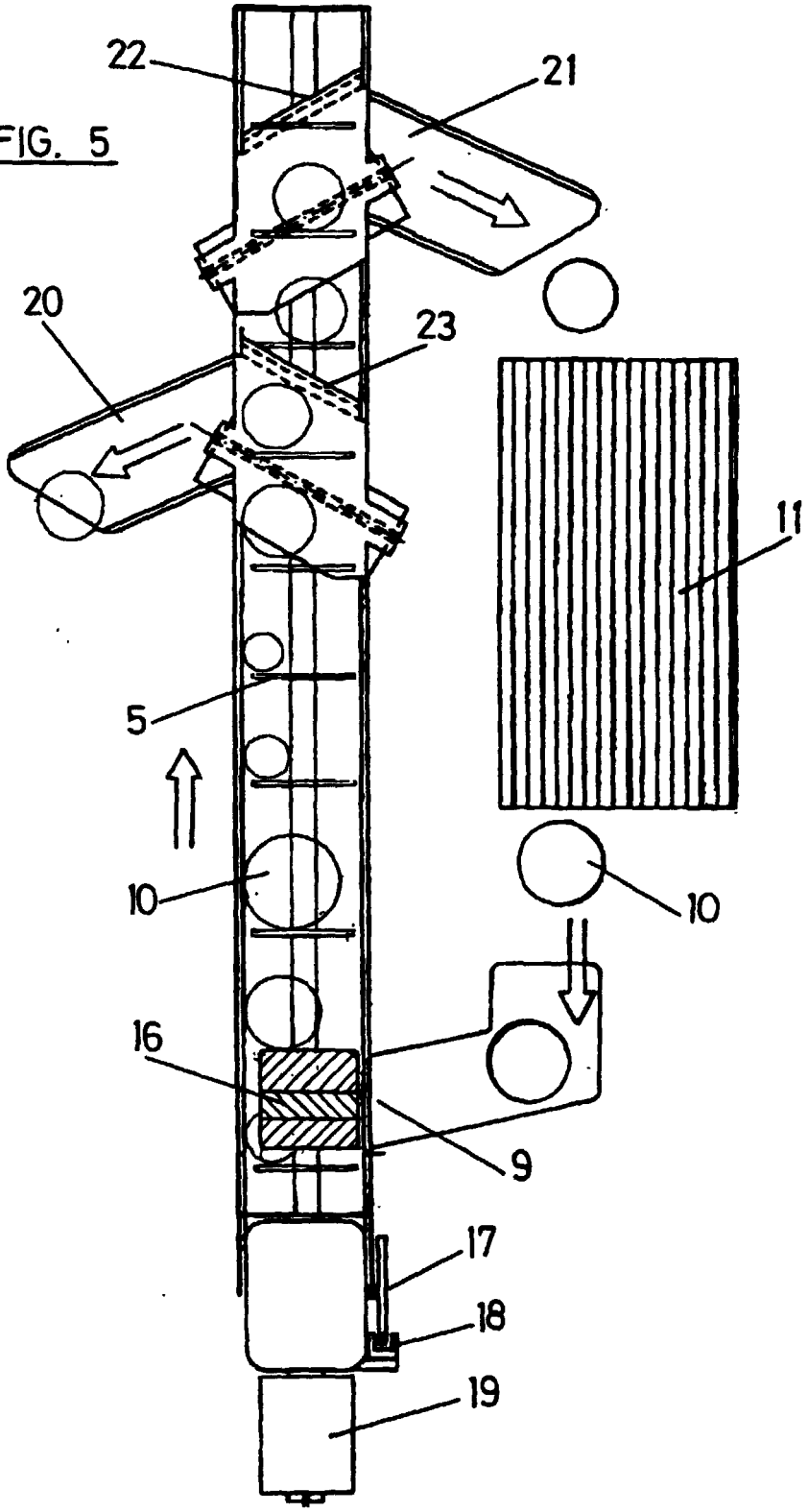


FIG. 4

FIG. 5



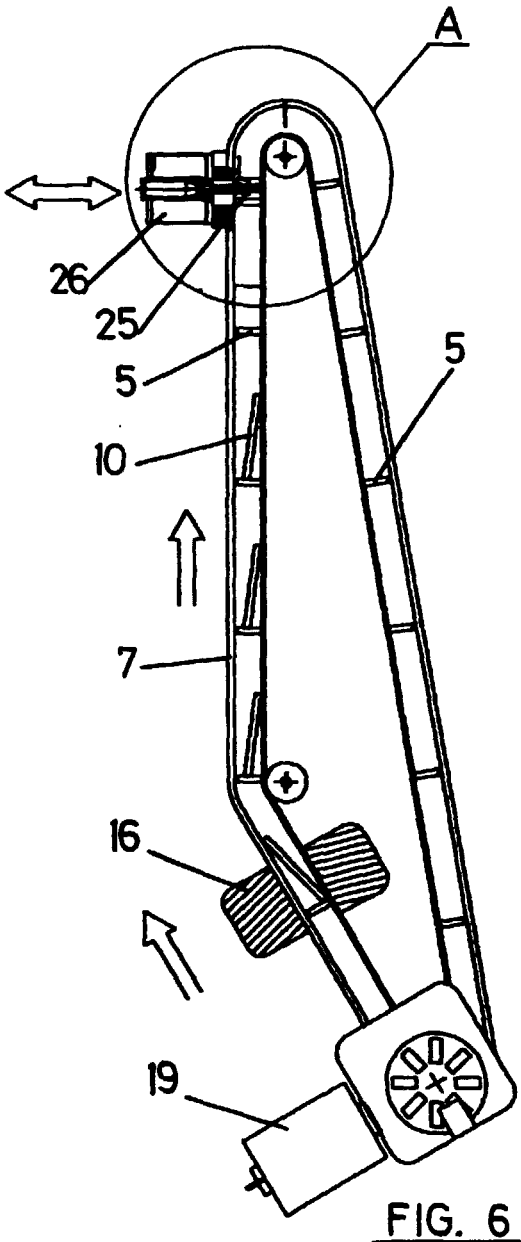


FIG. 6

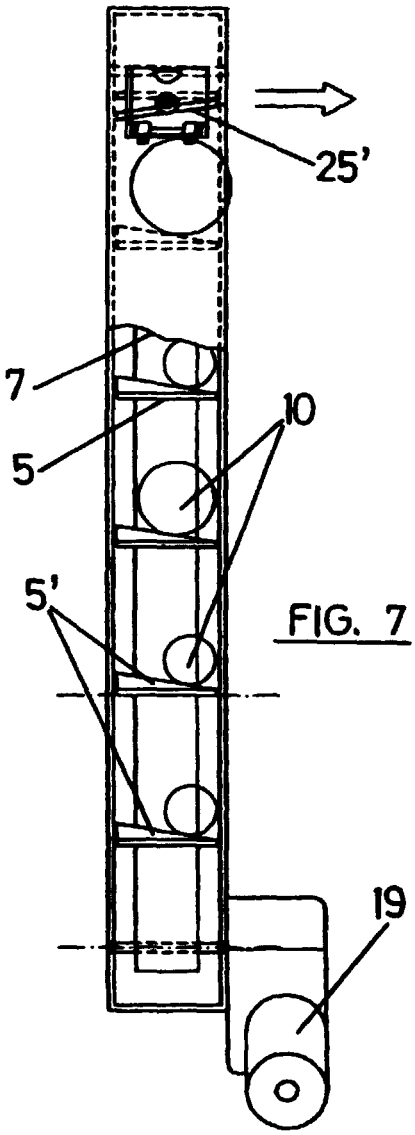


FIG. 7

FIG. 8

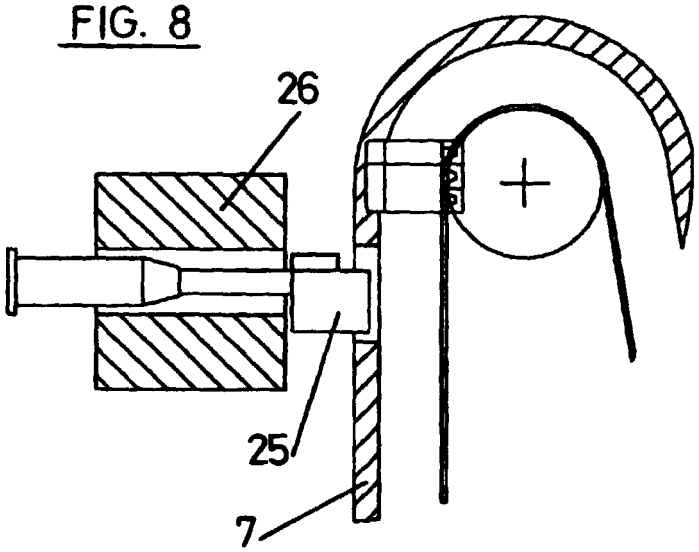
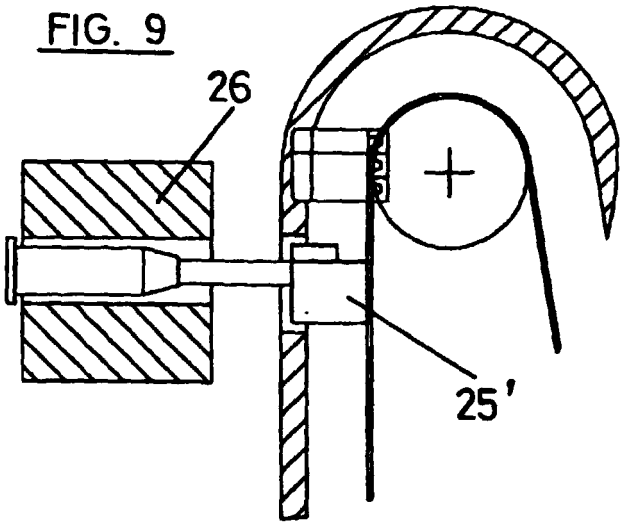


FIG. 9



INTERNATIONAL SEARCH REPORT

International Application No
PCT/ES 99/00228

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G07D3/14 G07D9/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G07D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB 1 386 304 A (BELL PUNCH COMPANY LIMITED) 5 March 1975 (1975-03-05) page 1, line 96 -page 3, line 23; figures 1-9	1
A	US 3 910 295 A (FLETCHER) 7 October 1975 (1975-10-07) column 1, line 54 -column 3, line 68; figures 1-3	1
A	US 5 496 211 A (ZIMMERMANN) 5 March 1996 (1996-03-05) column 3, line 43 -column 7, line 14; figure 1.7	1

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
7 October 1999	15/10/1999

Name and mailing address of the ISA	Authorized officer
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INTERNATIONAL SEARCH REPORT

International Application No
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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3 229 806 A (OTTO ET AL.) 18 January 1966 (1966-01-18) column 2, line 23 -column 5, line 26; figures 1-6	1
A	US 4 416 299 A (BERGMAN) 22 November 1983 (1983-11-22) column 2, line 24 -column 3, line 58; figures 1-4	1

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/ES 99/00228

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