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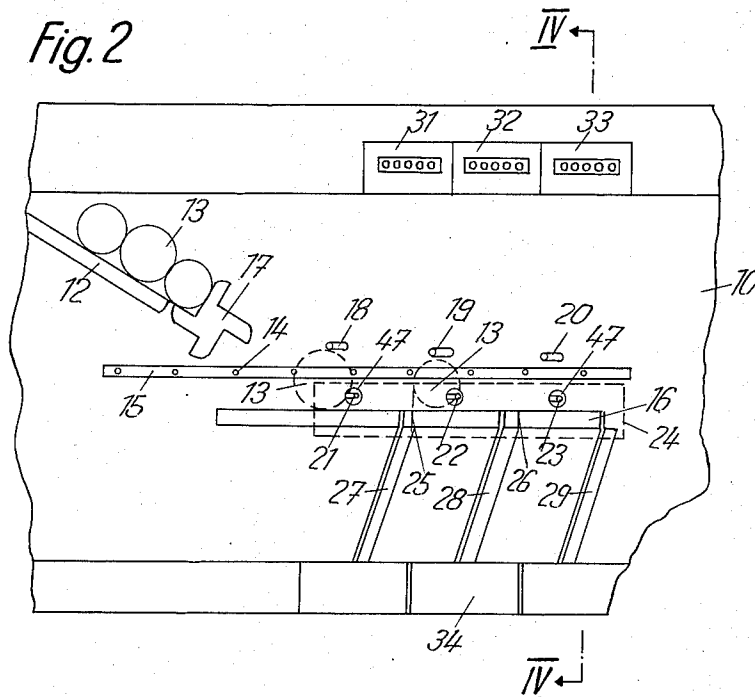
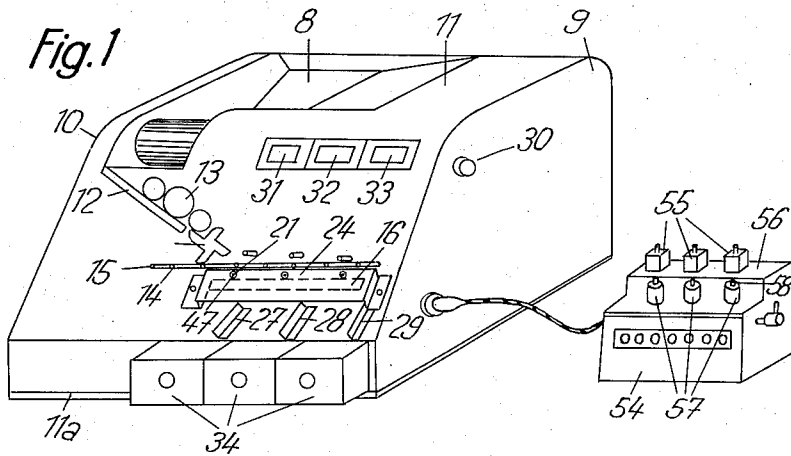
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3,002,601

COIN SORTING AND COUNTING MACHINE

Filed April 19, 1960

3 Sheets-Sheet 1



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Fig. 3

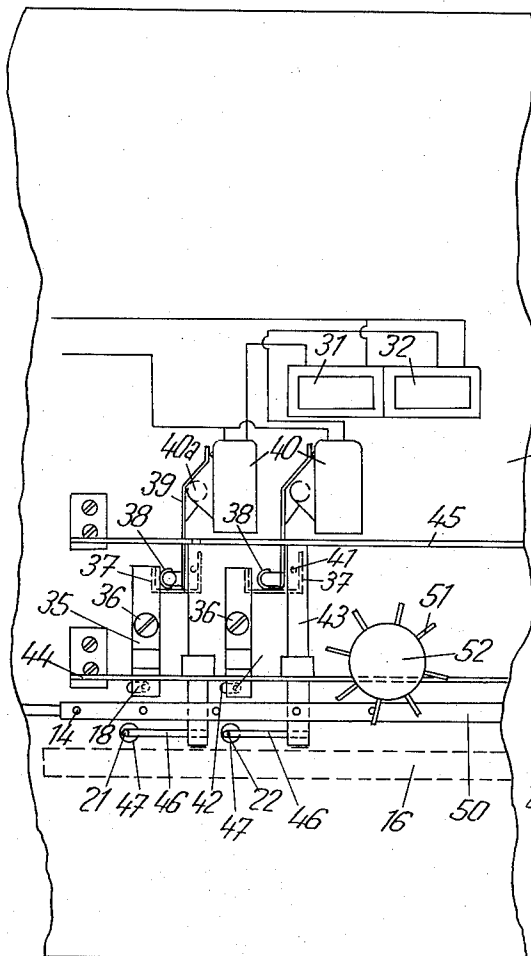
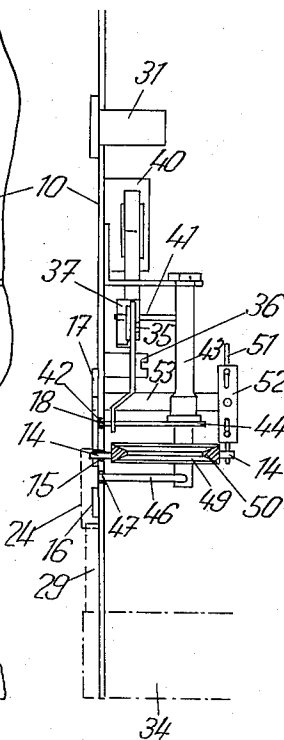


Fig. 4



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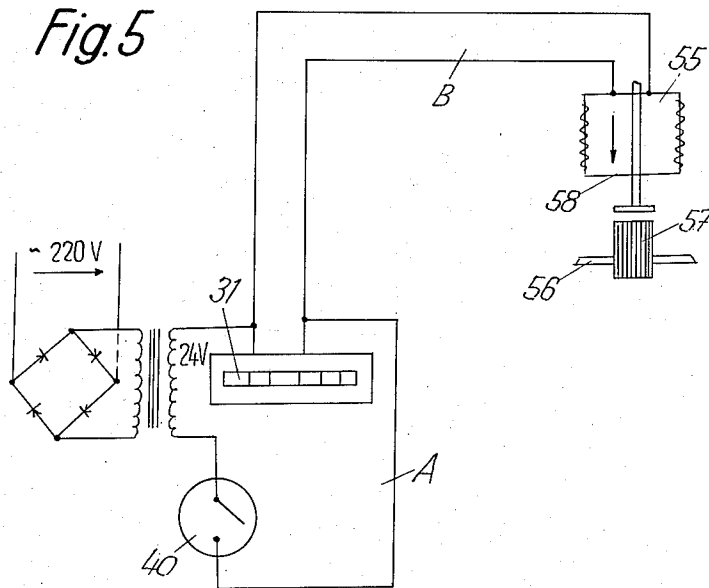
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COIN SORTING AND COUNTING MACHINE

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3 Sheets-Sheet 3



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COIN SORTING AND COUNTING MACHINE

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2 Claims. (Cl. 194—9)

This invention relates to a machine for sorting and counting coins of different sizes and values as they are received or accumulated unsorted and uncounted in cash businesses. Hitherto two separate operations have to be performed to arrange the coins, namely first they must be sorted and then counted. The different kinds of coins have to be counted one by one, possibly after setting the counting machines used for this purpose and, in order to ascertain the value the number of coins must then be multiplied by the actual value of the coin. All this constitutes an operation requiring a considerable amount of time to perform.

Counting sorting machines which sort simultaneously several kinds of coins according to their diameter and then feed them separately to different counting mechanisms or count them while sorting them, are known, but the expense entailed by their complicated construction and their susceptibility to trouble limit their use in practice. Owing to the fact that in the known constructions the coins drop under their own weight into appropriate sorting channels, errors occur in sorting and counting, because the slightest deformation or dirt will suffice to bring the coins into the wrong sorting channel.

The object of the invention is therefore to provide a coin sorting and counting machine in which every coin is positively guided by guiding means and this guiding means is constructed in a simple manner, at the same time ensuring that each coin, after being counted either numerically or according to its value, drops into a compartment provided for it.

The machine according to the invention for sorting and counting coins is provided with a funnel-shaped hopper at the outlet of which a rotatable feeding disc with radially extending arms, a conveyor belt or the like, substantially as described in my U.S. Patent specification 2,792,100 (Reis) is provided which pushes the coins forward one at a time towards the mechanism which is to deal with them, and is characterized by a rearwardly inclined front wall which has on its front side a downwardly extending inclined feed chute and a horizontally fixed guide rail along which the coins are pushed one behind the other by pins which project through a slot provided about the guide rail and are fixed at distances apart on a V-belt running behind the front wall in the interior of the housing, an entrainment cross being arranged between the feed chute and the guide rail, on the axle of which cross a disc is mounted which also has pins extending in radial direction which are driven by the pins on the V-belt and thus rotates the entrainment cross at the same speed and thereby regulate the transfer of the coins from one rail to the other, while above the guide rail and the slot elongated holes are provided in the front wall through which contact pins project which are at a distance from the guide rail decreasing in the direction in which the coins are transported and always slightly less than the diameter of one of the kinds of coins to be sorted, which contact pins actuate the counting mechanism coordinated with them on being impacted by a coin, while directly above the guide rail ejectors are arranged in holes in the front wall which, when the contact pins are actuated by the coins become operative and push the counted coins off the guide rail into separate catching devices.

The novel features and further details of the machine are hereinafter disclosed in the following description and

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claims. The invention is illustrated by way of example in the accompanying drawings, in which

FIG. 1 is a machine according to the invention in perspective view;

FIG. 2 shows, on a larger scale, part of the front wall with the functional parts mounted thereon;

FIG. 3 is a rear elevational view of the front wall;

FIG. 4 is a vertical section taken on line IV—IV of FIG. 2, and

FIG. 5 is a diagram showing a circuit arrangement.

The machine according to FIG. 1, which can be used for three sizes of coins 13, has a closed housing 9 with a front wall 10, a top 11, a bottom plate 11a and smooth rear and side walls and can be placed on a table. The top 11 and the front wall 10 merge into each other in a downward slope. The top 11 is constructed with slanting parts forming a hopper 8 which serves for pouring in the coins to be dealt with. The front wall 10 carries the equipment serving for sorting and counting or the visible parts for the operation thereof, whereas the other parts are arranged behind the front wall 10 in the interior of the housing 9. At the lower end of this front wall 10 and on the bottom plate 11a drawer-like receptacles 34 for the sorted and counted coins are arranged.

It is advisable to connect electrically this machine with a conventional adding mechanism 54 which serves for ascertaining the value of the sorted and counted coins.

As shown in FIGS. 1 and 2, a feed chute 12 is fixed on the front wall 10, to which feed chute 12 the coins 13 are fed in a known manner by a rotary feed disc, not shown, through the intermediary of a conveyor belt or the like. Such arrangements ensure that the coins 13 roll in a row one behind the other over the feed chute 12 from the left to the right in FIGS. 1 and 2 along the front wall 10, standing on edge in spite of being of different diameters. They are then engaged individually by an entrainment cross 17 which feeds them to a guide rail 16.

Each coin 13 arriving on this rail 16 is pushed on by a pin 14. These pins 14 project through a horizontal slot 15. They are fixed at distances apart on a V-belt 50 (FIGS. 3, 4) running in the housing behind the front wall 10. The pins 14 push the coins 13 along the rail 16 until they come into contact with a contact pin 18, 19 or 20 provided for them. These contact pins are located above the slot 15 in the front wall 10 and project through elongated openings 42 (FIG. 3) in said wall and are at different distances apart. The height of these pins above the guide rail 16 decreases from the left to the right in FIGS. 1 and 2, in the direction of movement of the coins 13 in accordance with the difference in size of the coins. One such contact pin is provided for each kind of coin. The height of each contact pin from the guide rail 16 is slightly less than the diameter of the kind of coin for which the contact pin is provided. It is however greater than the diameter of the next smaller kind of coin. Each of these contact pins 18, 19 and 20 shifts a coordinated counter mechanism 31, 32 or 33 by one unit when a coin 13 strikes against the particular pin.

The entrainment cross 17 is, as shown in FIGS. 3 and 4, rotated by an axle 53 carrying a disc 52 with radial pins 51 which are driven by the pins 14 carried by the V-belt 50. As a result only one coin 13 can at any time get between two adjacent pins 14.

Ejector pins 21, 22 and 23 are arranged in holes 47 above the guide rail 16 and when in inoperative position do not project out of the front wall 10. These pins 21, 22 and 23 can be mechanically or electromagnetically pushed forward out of the front wall 10 behind the contact pins 18, 19 and 20, respectively, such a distance that

they reliably push off the guide rail 16 a coin which is on the guide rail 16 and touching the contact pin 18, 19 or 20 corresponding to its size.

The counter mechanisms 31, 32 and 33 for the contact pins 18, 19 and 20 and consequently for each kind of coin are provided above the guide rail 16. These contact pins are mechanically connected with the ejector pins 21, 22 and 23. Each ejector pin operates in a catching device 24. This device 24 consists, for example, of a cap, as shown by dashed lines in FIGS. 1, 2 and 4, which is detachably connected to the front wall 10 by screws. On the inner side of this cap partition walls 25 and 26 are arranged at right angles as baffles. By this construction, vertical open channels are formed which guide the coins individually on to the deflector rails 27, 28 and 29 over which they fall into their drawer-like collecting receptacle 34 provided on the bottom plate 11a.

FIG. 3 shows the machine viewed from the rear side of the front wall 10 with only two aggregates.

The counter mechanisms 31 and 32 are mounted on the rear side of the front wall 10 and can be zeroized from outside by means of a hand knob 30 not shown. Microswitches 40 actuated by levers 39 serve for shifting on the figure cylinders. A torsion spring 40a is fitted in the pivot of each lever 39. Two shafts 43 are mounted between two bars 44 and 45. These shafts each carry a pin 41 around which a lever 35 mounted on a pivot 36 engages by means of a U-shaped extension 37 which also engages around the end of the lever 39 of the microswitch 40 carrying a roller 38. By turning the lever 35 in clockwise direction in FIG. 3 the left hand lateral inner surface of the extension 37 comes into contact with the roller 38 of the microswitch 40 and presses it towards the right. As a result impulses are released through the intermediary of the contact pins 18 and 19 fixed on the levers 35 and effect the displacement of the coordinated counter mechanism 31 or 32 by one unit.

Each of the counter mechanisms 31, 32 and 33 is, according to FIG. 1, electrically connected in parallel with an electric lifting magnet or solenoid 55 rigidly connected with a plate 56. This plate 56 is rigidly connected with the adding machine 54. Each lifting magnet or solenoid 55 is located above a key 57 belonging to the value amount of the coin and a push rod 58 of the magnet or solenoid 55, on being energized by an electric impulse, presses the key 57 downwards and thus causes the adding cylinder of the adding machine 54 to turn.

If, for example, the contact 18 is pushed in the direction in which the coins travel, that is from the right to the left in FIG. 3, in the elongated opening 42, the lever 35 turns in clockwise direction. The left lateral inner surface of the U-shaped extension 37 thereby comes into contact with the roller 38 of the microswitch 40 and presses it towards the right. As a result the switch 40 is actuated and moves the counter mechanism 31 on one unit. Thereupon the following turn of the lever 35 in clockwise direction brings the lever 39 into contact with the front end of the pin 41 and pushes it towards the right. As a result the shaft 43 is rotated and the front end of the rectangular ejector pin 21 on the lever 46 is pushed out from the hole 47 so that it projects from the front wall 10 and strikes against the coin standing on the guide rail 16, pushing it forward over the edge of the guide rail 16. The coin 13 then drops and is conducted to its collecting receptacle 34 over the device 24. The lever 35 with the contact pin 18, as well as the pin 41 with the shaft 43 and the ejector pin 21 are returned into their initial positions through the intermediary of the roller 38 by the force of the torsion spring 40a. The slot 15 in the front wall 10 is arranged above the guide rail 16 and extends parallel thereto. Behind the slot 15 the V-belt 50 extends along the entire length thereof and is supported by two pulleys 48 and 49. The pins 14 are mounted on the outer surface of this belt and project on the strand of the belt facing the front

wall 10 through the slot 15. These pins 14 are spaced in such a manner that the distance between them is greater than the diameter of the largest coin to be sorted and counted. One of the two pulleys 48 and 49 is connected by a shaft, not shown, with a driving motor which is accommodated in the housing 9.

When using the machine, the coins are first fed by a known device on to the feed chute 12. The pulleys 48 and 49 are at the same time started up by the motor and set in motion the V-belt 50 carrying the pins 14. These pins 14 drive the pins 51 fixed radially on the disc 52. This disc 52 is keyed on the axle 53 which is rotatably mounted in the front wall 10. Due to the rotation of the disc 52 and the axle 53, the entrainment cross 17 fixed on the other end of the axle is set in motion, with the result that the coins commence to circulate in the manner described in detail above and must positively follow the path there indicated.

The machine can be fitted with as many sorting, counting in ejector units as there are kinds of coins to be sorted and counted, these units being arranged side by side with the space between the contacts 18, 19 and so forth and the guide rail 16 becoming less in the direction in which the coins travel.

The circuit arrangement shown in FIG. 5 is for counting electrically first the number of coins of each kind and then the total value of the individual kinds of coins, for which purpose the counter mechanisms 31 and the adding machine 54 are provided.

For example, alternating current with 220 volts is taken from the supply mains and converted into 24 volt direct current by a transformer. The two circuits A and B, which are connected in parallel, are supplied with this voltage. A microswitch 40 and a counter mechanism 31 counting the number of coins 13 and springing one step at a time are connected up in the circuit A. Each of the contact pins 18 to 20, according to FIG. 2 or 4, is coordinated to one part of the counter mechanism. The circuit B extends parallel to the circuit A and serves for counting the values or indicating the total amount in the adding mechanism 54. The plate 56 (FIG. 1) carrying this mechanism is connected up with the lifting magnets 55 and each lifting magnet 55 is actuated by an incoming impulse so that its push rod 58 moves towards the key 57 causing a rotation of the adding machine 54.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiment is therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

I claim:

1. Coin sorting and counting machine, comprising a housing with a funnel-shaped hopper for receiving the coins to be sorted and counted, a transporting device at the outlet of said funnel-shaped hopper moving the coins individually forward to be sorted and counted, a front wall of said housing sloping upwardly towards the rear of the machine and having a continuous horizontal slot, a downwardly sloping feed chute on the front of said front wall leading from the delivery end of said transporting device, a horizontal guide rail fixed on the front of said front wall parallel to said slot and extending from the delivery end of the feed chute at a lower level and below and in front of said slot, an endless belt mounted in the interior of said housing and having a run moving behind said front wall, entrainment pins fixed on said belt and progressively projecting through said longitudinal slot, said pins being spaced to take only one coin between two entrainment pins, an entrainment cross located between the delivery end of said feed chute and the receiving end of said guide rail, an axle carrying said

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entrainment cross, a disc with radial pins mounted on said axle and rotated by the pins fixed on the belt to regulate the transfer of the coins from the feed chute to the guide rail, contact pins projecting through elongated holes in the front wall above the guide rail and horizontal slot, the distance of these contact pins above the guide rail decreasing successively in the direction in which the coins travel and in each case being smaller than the diameter of one of the kinds of coins to be sorted, a counter mechanism coordinated to each of said contact pins actuated on impact with an oncoming coin to count each type of coin, an adding machine coordinated with said counter mechanisms to indicate the total value of coins and having a plurality of keys, lifting magnets one incorporated in each of said counter mechanisms rendered operative by the oncoming coins, push rods of said magnets actuating the keys of said adding machine, ejector pins mounted in holes in said front wall above said guide rail but below said horizontal slot and mechanically actuated by said contact pins under the influence of the coins, a catching device for the different kinds of coins arranged on said front wall at the height of said guide rails for receiving the coins ejected by said ejector pins, and a collecting receptacle under said catching device for receiving the sorted coins from said catching device.

2. Coin sorting and counting machine with a housing having a funnel-shaped hopper for receiving the coins to be sorted and counted, a transporting device at the outlet of said funnel-shaped hopper moving the coins individually forward to be sorted and counted, a front wall of said housing sloping upwardly towards the rear of the machine and having a continuous horizontal slot, and a downwardly sloping feed chute on the front of said front wall leading from the delivery end of said transporting device, said coin sorting and counting machine comprising a horizontal guide rail fixed on the front of said front wall parallel to said slot and extending from the delivery end of said feed chute at a lower level and below and in front of said slot, an endless belt rotatable in the interior of said housing behind said front wall, entrainment pins fixed on said belt and projecting

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through said horizontal slot, said entrainment pins being spaced to take only one coin between two entrainment pins and being adapted to positively move forward the coins on said horizontal guide rail, an entrainment cross located between the delivery end of said feed chute and the receiving end of said guide rail, an axle carrying said entrainment cross, a disc with radial pins mounted on said axle and positively rotated by said pins fixed on said belt to regulate the transfer of the coins from the feed chute to the guide rail, contact pins projecting through elongated holes in the front wall above the guide rail and horizontal slot, the distance of these contact pins above the guide rail decreasing successively in the direction in which the coins travel and in each case being smaller than the diameter of one of the kinds of coins to be sorted, a counter mechanism coordinated to each of said contact pins actuated on impact with an oncoming coin to count each type of coin, an adding machine coordinated with said counter mechanisms to indicate the total value of coins and having a plurality of keys, lifting magnets one incorporated in each of said counter mechanisms rendered operative by the oncoming coins, push rods of said magnets actuating the keys of said adding machine, ejector pins mounted in holes in said front wall above said guide rail but below said horizontal slot and mechanically actuated by said contact pins under the influence of the coins, a catching device for the different kinds of coins arranged on said front wall at the height of said guide rails for receiving the coins ejected by said ejector pins, and a collecting receptacle under said catching device for receiving the sorted coins from said catching device.

References Cited in the file of this patent

UNITED STATES PATENTS

1,076,113	Harralson	Oct. 21, 1913
1,936,035	Sherman	Nov. 21, 1933
2,423,502	Jorgensen	July 8, 1947
2,635,730	Seckula	Apr. 21, 1953
2,764,990	Pick	Oct. 2, 1956