March 5, 1963 E. H. THOMPSON 3,079,934

COIN SORTING AND COUNTING MECHANISM

Filed Feb. 13, 1961 3 Sheets-Sheet 1

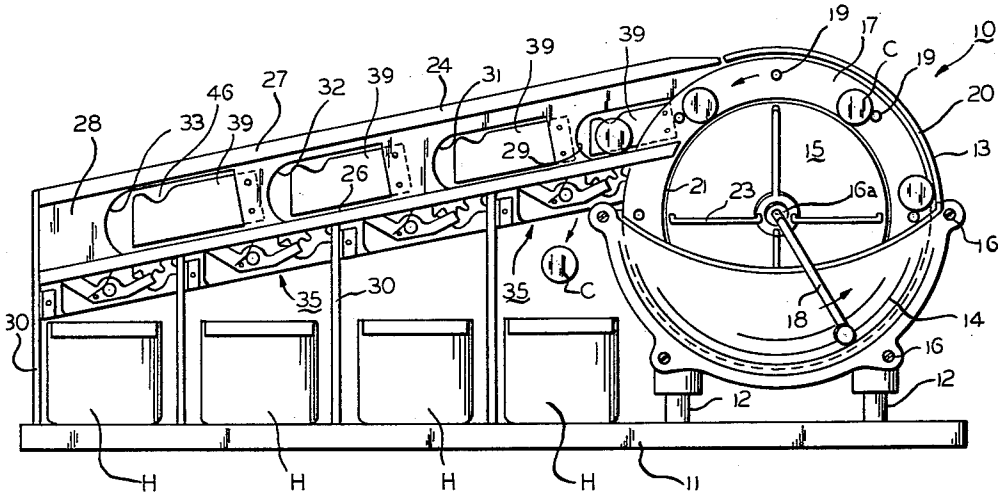


FIG. 1

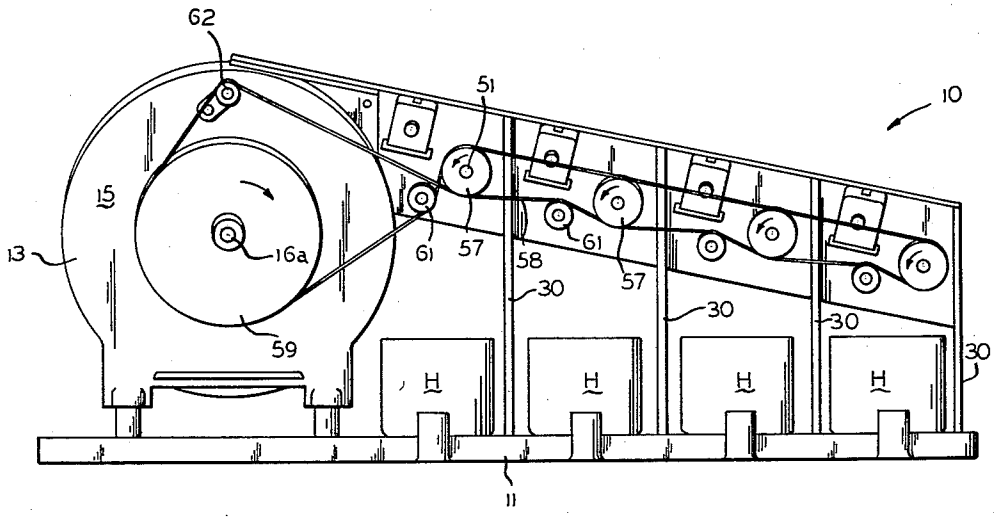


FIG. 2

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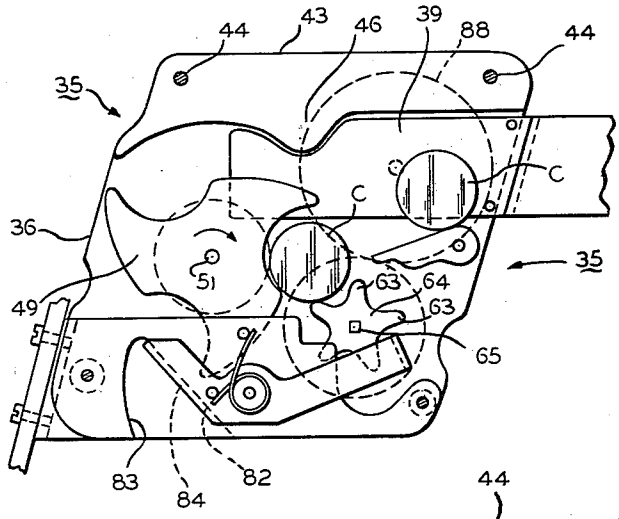


FIG.3

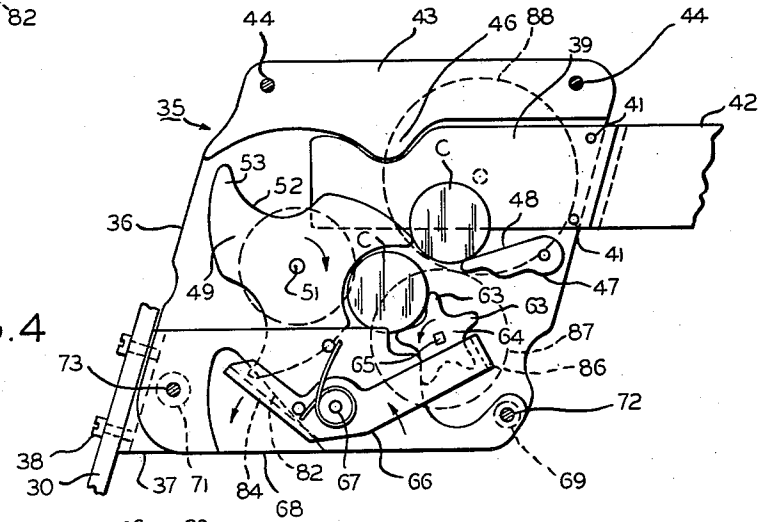


FIG.4

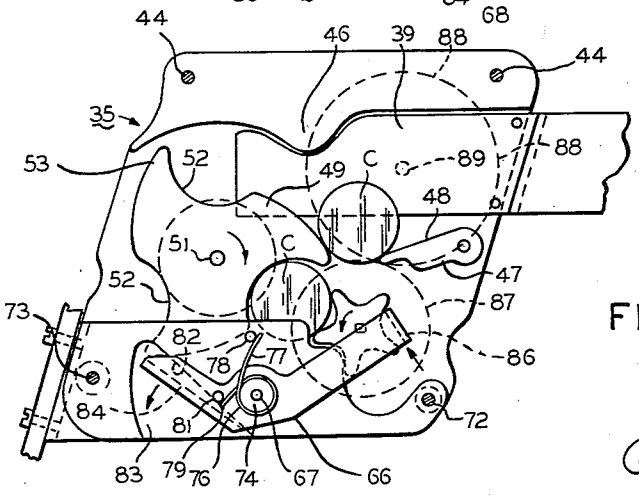


FIG.5

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COIN SORTING AND COUNTING MECHANISM

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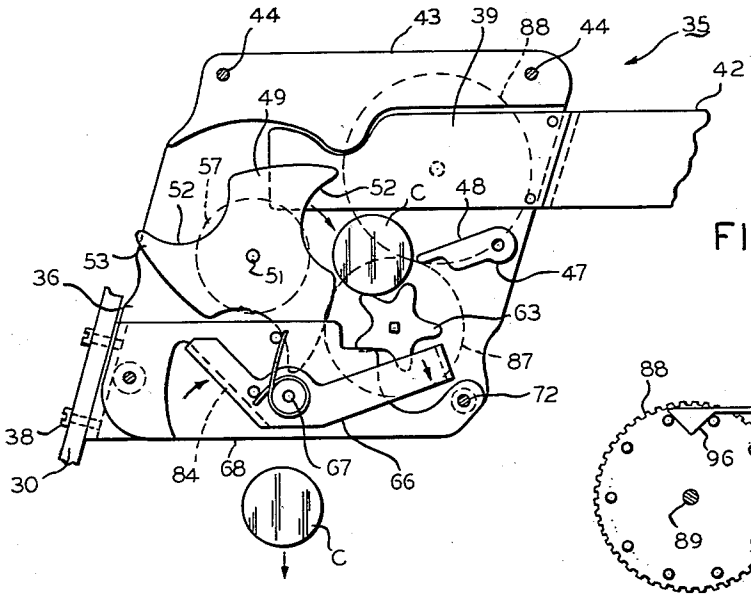


FIG.6

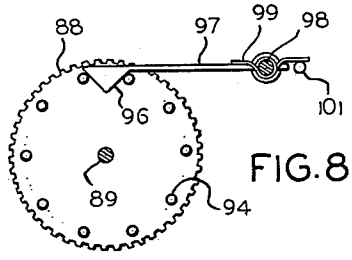


FIG.8

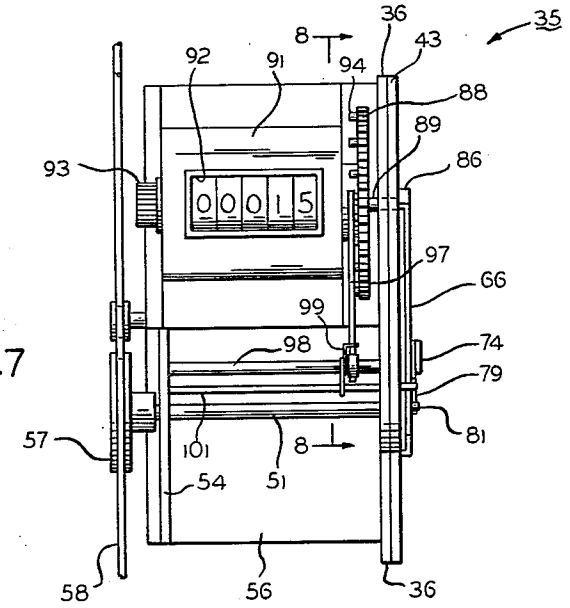


FIG.7

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COIN SORTING AND COUNTING MECHANISM

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Filed Feb. 13, 1961, Ser. No. 88,753
7 Claims. (Cl. 133—8)

This invention relates generally to coin handling mechanisms, and particularly to an improved mechanism for sorting and counting coins of different denominations.

According to the present invention, coins of different denominations are moved along a tarck where they are separated at stations therealong, each station handling coins of a single denomination only and effecting a count of the coins of the single denomination thereat. Each coin separated at such station cooperates with mechanism which counts the coin, and is actuatable only when a coin to be counted is present at the mechanism. Such mechanism includes an escapement which is for completing a count of the coin.

With the foregoing considerations in mind it is a principal object of this invention to provide a mechanism for sorting coins of different denominations and counting the coins of each denomination.

Another object is to provide a continuous operating mechanism which will sort coins of various denominations, each denomination being separated at sorting stations, the same mechanism for effecting sorting being also effective to drive a counting mechanism at each sorting station.

Still another object is to combine a counting device for each denomination of sorted coins with structure for moving the coins in the sorting thereof, such counting device being driven by the same mechanism for moving the coins in sorting.

A further object is to provide a counting mechanism which is continuously operated while coin sorting is being carried on, and which is actuated to complete a counting cycle only when a coin is present at a coin separating station.

A yet further object is to separate coins according to denomination at a plurality of separating stations, and to move by gravity the separated coins at such station into a coin counting device which counts and discharge the counted coins into a suitable receptacle.

Other objects and important features of the invention will be apparent from a study of the following specification, taken with the drawings which together describe and illustrate a preferred embodiment of the invention, and what is now considered to be the best mode or practicing the principles thereof. Other embodiments may be suggested to those having the benefit of the teachings herein, and such other embodiments are intended to be reserved especially as they fall within the scope of the subjoined claims.

In the drawings:

FIG. 1 is a front elevational view of a coin sorting and counting mechanism embodying the improvements according to the present invention;

FIG. 2 is a back elevational view thereof;

FIG. 3 is a front elevational view of a typical counting station showing a separated coin commencing a counting cycle;

FIG. 4 is a view similar to FIG. 3, but showing the coin substantially mid-way of its movement in the counting cycle;

FIG. 5 is a view similar to FIGS. 3 and 4, showing the position of the coin at the instant the count thereof is completed;

FIG. 6 is a view similar to FIG. 3 and showing a second coin commencing its movement in a counting cycle, and

showing a counted coin being discharged from the counting station;

FIG. 7 is a plan view of a counting mechanism adapted to be used at the counting stations seen in FIGS. 3 to 6; and

FIG. 8 is an elevational view looking in the direction of the arrows 8—8 of FIG. 1.

Referring particularly to FIGS. 1 and 2 of the drawings, the improved coin sorting and counting mechanism is referred to generally by the reference numeral 10 and includes a base 11 having standards 12 extending upward therefrom which support a back frame 13 of a coin moving apparatus 15.

The back frame 13 is inclined slightly out of a vertical plane for a purpose as will appear, and an essentially quarter-spherical shaped member 14 is held to the back frame 13 by screws 16. Member 14 and back frame 13 define a hopper for coins to be separated and counted. The back frame 13 affords a support for a shaft 16 having a rotating coin pick-up plate 17 attached thereto. The shaft 16 and the pick-up plate 17 are rotated in a counter clock-wise direction by a crank 18. The plate 17 has equally spaced small bosses 19 extending therefrom which serve to engage the rim of the coins C and move same individually from the bottom of the hopper 14 and upward, the coins C having such movement by a combination of centrifugal force imparted to the coin and also by reason of the bosses 19. As the coins are moved by plate 17 and bosses 19 they are restrained against centrifugal movement by a rim 20 on the back frame 13.

The plate 17 also has a slightly raised annular ring 21 embossed therein which aids in holding the coin C against the rim 20 of the back frame 13. Radial ribs 23 are spaced from the plane of the plate 17 and help properly to orient the coins in the hopper 14 so that they can be picked up by the bosses 19.

The individual coins C are ejected from the rotating plate 17 on to a track 24 having a lower rail 26 and an upper rail 27, the two rails 26 and 27 being connected by a web 28. The track 24 is supported at intervals throughout its length upon standards 30 extending upward from base 11. Web 28 has slots 29, 31, 32 and 33 spaced substantially equally throughout the length thereof. Slot 29 is of a width corresponding to the smallest coin to be separated; for example, ten cent pieces; slot 31, one cent pieces; slot 32, five cent pieces; and slot 33, twenty-five cent pieces. The rail 26 is sloped so that the coins can move by gravity therealong to be separated at the respective slots just described according to their denominations.

The track 24 is thus arranged to provide a plurality of separating stations 35 for the coins, each such station having a counting mechanism where the separated coins of a single denomination are counted, the counted coins dropping into a hopper H disposed at each such station.

Referring particularly to FIGS. 3 to 8 inclusive of the drawings, each such station has a counting mechanism indicated generally by the reference numeral 35 and comprising plate-like frames 36 which are secured by small angle members 37 and cap screws 38 to the vertical standards 30. A ramp 39 made of thin phosphor bronze or the ilke is held to the frame by counter sunk rivets 41, and together with a ramp 42 secured to the web 28 and lying behind the frame of the web 28, afforts a guide for a coin C as it falls into the proper slot in the web 28.

The frame 36 has a guide plate 43 overlying the same, plate 43 and the plate 36 being held to the web 28 of the track 24 by mounting screws 44 which are tapped into the track 24. The guide plate 43 is integral with a deflector boss 46 which serves to limit the movement of the coin C to the left. The frame 36 also supports a fixed guide plate 47, the coin C moving by gravity along an upper edge 48 of the guide 47.

Each coin C is adapted to be engaged by an impeller 49 fixed on a shaft 51 and having equiangularly disposed pockets 52 therein, and coin contacting lobes 53 which act to hold back a coin on to the surface 48 of the guide 47 until the coin can be engaged in a sucecssive pocket 52 on the impeller 49. The shaft 51 is also arranged to be supported in a frame 54 spaced from the frame 36, and held in such spaced relationship with respect to the frame 36 by a connecting web 56.

The impeller shaft 51 is turned by a pulley 57, and an endless belt 58 is trained about the pulley 57 as seen more clearly in FIGS. 2. The endless belt 58 is driven by a pulley 59 fast on the shaft 16 of the coin moving apparatus 15, and suitable idler pulleys 61 are provided for guiding the endless belt 58. The back frame 13 of the coin moving apparatus 15 may also be provided with a belt take-up idler pulley 62.

It may be noted at this point that while the mechanism is shown as being hand operated by the crank 18, there may equally as well be provided a motor for driving the shaft 16, whether on the back of the back frame 13, or elsewhere as desired.

Referring back to FIGS. 3 to 6 of the drawings, the engagement of the coin C in the pocket 52, causes the coin C to move into contact with a pair of the equiangularly spaced lobes 63 of a counting wheel 64 mounted on a shaft 65 supported in the frame 36. The movement of the coin C by the impeller 49 and the contact of the coin C with the lobes 63 causes the counting wheel 64 to be rocked to a position as seen in FIG. 4.

The lobe 53 of the impeller wheel 49 cooperates with an escapement lever 66 pivoting on a pin 67 supported on a plate 68 spaced from the frame 36 a distance corresponding to the thickness of the impeller 49 and the counting wheel 64, there being washers 69 and 71 retained between the plates 68 and the frame 36 and held in position by mounting screws 72 and 73. The lever 66 has a boss 74, and a torsion spring 76 wrapped around boss 74 has one end 77 bearing against a small boss 78 extending from the plate 68 and its other end 79 abutting a boss 81 extending from the lever 66. The action of the spring 76 is such as normally to bias the lever 66 in a clockwise direction, its movement being limited by a cheek 82 of a notched out portion 83 in the plate 68.

The lever 66 has an off-set 84 adapted to be contacted by a lobe 53 of the impeller 49 to rock the lever 66 in a counterclockwise direction. The other end of the lever 66 has an off-set portion 86 adapted to move against the lobe 63 of the counter wheel 64 to complete the rocking movement of the counting wheel 64 to the position as seen in FIG. 5.

The continued turning movement of the impeller 49 causes the lobe 53 thereof to move past the lobes 63, 63 of the counter wheel 64, the coin C being then released from the pocket 52. Likewise, the continued rotation of the impeller 49 causes the lever 66 to be rocked in a clockwise direction as seen in FIG. 6, the off-set portion 84 thereof once again moving into contact with the cheek 82 of the slot 83.

In the event there are no coins in position to be engaged in the pockets 52 of the impeller 49, the impeller 49 merely moves past the lobes 63, 63 of the counting wheel 64, the lever 66 merely rocking by reason of its contact with the lobe 53. Since there is no coin in position to give an initial rocking movement to the counting wheel 64, the off-set 86 of the lever 66 cannot engage the next lobe 63 in the counting wheel 64 to advance it as seen in FIG. 5.

It is evident therefore that the impeller 49 and the counting wheel 64 cooperate with the coin C to advance the counting wheel 64 an increment corresponding to the count of a coin.

The shaft 65 supporting the counting wheel 64 has a pinion 87 thereon which meshes with a gear 88 fast on a shaft 89 of a counter 91, see also FIG. 7. The counter 91 has a dial 92 and a conventional reset button 93.

Structure is provided for preventing the retrograde movement of the counter 91, and to this end the gear 88, see FIG. 8, has pins 94, ten in number and equally spaced close to the periphery of the gear 88 and cooperating with a pawl 96 mounted at the end of rock arm 97 pivoted on a shaft 98 extending between the two frames 36 and 54. A torsion spring 99 has one end bearing on the rock arm 97 and its other end bearing against an abutment 101 extending between the frames 36 and 54, and the rock arm 97 is thus lightly biased in a counter clockwise direction as seen in FIG. 8, to prevent the unintended movement of the gear 88 and an unintended count on the counter 91. Each cycling of the counting wheel 64 thus causes the pawl to be raised by the pin 94 into a successive interval between the next adjacent pins 94.

From the description foregoing it is believed evident that there has been provided a new and useful improvement in mechanisms for separating and counting coins of different denominations. While the invention has been shown and described in terms of a preferred embodiment thereof, the scope is intended to be limited only by the claims here appended.

I claim:

1. In a coin sorting and counting mechanism having a hopper for unsorted coins, means for separating individual coins from said hopper, a track for receiving and moving therealong an individual coin which has been separated by said means, coin receiving slots spaced along said track, each slot being of a width corresponding to the diameter of a coin being sorted and being adapted to separate from said track coins of a particular denomination; the improvement comprising means cooperating with each of said coin receiving slots for counting the coins after each coin has been individually separated at said track comprising a frame extending below said track, a guide on said frame for a separated coin, a shaft mounted on said frame including means for driving said shaft, an impeller fast on said shaft and having a plurality of coin receiving pockets therein, said impeller having coin contacting lobe portions intermediate said coin receiving pockets for holding a coin along said guide for entrance to a succeeding pocket, a counting wheel shaft mounted in said frame and a counting wheel mounted on said counting wheel shaft, said counting wheel having equiangularly spaced lobes thereon and being adapted to be rotated through a partly complete counting cycle by a coin disposed in said pocket and between adjacent lobes on said counting wheel, and an escapement cooperating with said impeller and said counting wheel and adapted to be rocked by a lobe of said impeller and to contact a lobe of said counting wheel to complete a counting movement thereof.

2. In a coin sorting and counting mechanism having a hopper for unsorted coins, means for separating individual coins from said hopper, a track for receiving and moving therealong an individual coin which has been separated by said means, coin receiving slots spaced along said track, each slot being of a width corresponding to the diameter of a coin being sorted and being adapted to separate from said track coins of a particular denomination; the improvement comprising means cooperating with each of said coin receiving slots for counting the coins after each coin has been individually separated at said track comprising a frame extending below said track, a guide on said frame for a separated coin, a shaft mounted on said frame including means for driving said shaft, an impeller fast on said shaft and having a plurality of coin receiving pockets therein, said impeller having coin contacting lobe portions intermediate said coin receiving pockets for holding a coin along said guide for entrance to a succeeding pocket, a counting wheel shaft mounted in said frame and a counting wheel mounted on said counting wheel shaft, said counting wheel having equi-

angularly spaced lobes thereon and being adapted to be rotated through a partly complete counting cycle by a coin disposed in said pocket and between adjacent lobes on said counting wheel, an escapement cooperating with said impeller and said counting wheel and adapted to be rocked by a lobe of said impeller and to contact a lobe of said counting wheel to complete a counting movement thereof, and a counting mechanism secured to said frame and driven by said counting wheel shaft.

3. In a coin sorting and counting mechanism having a hopper for unsorted coins, means for separating individual coins from said hopper, a track for receiving and moving therealong an individual coin which has been separated by said means, coin receiving slots spaced along said track, each slot being of a width corresponding to the diameter of a coin being sorted and being adapted to separate from said track coins of a particular denomination; the improvement comprising means cooperating with each of said coin receiving slots for counting the coins after each coin has been individually separated at said track comprising a frame, a shaft mounted on said frame including means for driving said shaft, an impeller fast on said shaft and having a plurality of coin receiving pockets therein, said impeller having coin contacting lobe portions intermediate said coin receiving pockets for holding a coin in position for entrance to a succeeding pocket, a counting wheel shaft mounted in said frame and a counting wheel mounted on said counting wheel shaft, said counting wheel having equiangularly spaced lobes thereon and being adapted to be rotated through a partly complete counting cycle by a coin disposed in said pocket and between adjacent lobes on said counting wheel, an escapement cooperating with said impeller and said counting wheel and adapted to be rocked by a lobe of said impeller and to contact a lobe of said counting wheel to complete a counting movement thereof.

4. In a coin sorting and counting mechanism having a hopper for unsorted coins, means for separating individual coins from said hopper, a track for receiving and moving therealong an individual coin which has been separated by said means, coin receiving slots spaced along said track, each slot being of a width corresponding to the diameter of a coin being sorted and being adapted to separate from said track coins of a particular denomination; the improvement comprising means cooperating with each of said coin receiving slots for counting the coins after each coin has been individually separated at said track comprising a frame, a shaft mounted on said frame including means for driving said shaft, an impeller fast on said shaft and having a plurality of coin receiving pockets therein, said impeller having coin contacting lobe portions intermediate said coin receiving pockets for holding a coin in position for entrance to a succeeding pocket, a counting wheel mounted on said frame and having equiangularly spaced lobes thereon and being adapted to be rotated through a partly complete counting cycle by a coin disposed in said pocket and between adjacent lobes on said counting wheel, an escapement cooperating with said impeller and said counting wheel and adapted to be rocked by a lobe of said impeller and to contact a lobe of said counting wheel to complete a counting movement thereof.

5. In a coin sorting and counting mechanism having a hopper for unsorted coins, means for separating individual coins from said hopper, a track for receiving and moving therealong an individual coin which has been separated by said means, coin receiving slots spaced along said track, each slot being of a width corresponding to the diameter of a coin being sorted and being adapted to separate from said track coins of a particular denomination; the improvement comprising means cooperating with each of said coin receiving slots for counting the coins after each coin has been individually separated at said track comprising a frame, a guide, an impeller having a plurality of coin receiving pockets therein, said impeller having coin contacting lobe portions intermediate said coin receiving pockets for holding a coin for entrance to a succeeding pocket, a counting wheel mounted on said frame and having equiangularly spaced lobes thereon and being adapted to be rotated through a partly complete counting cycle by a coin disposed in said pocket and between adjacent lobes on said counting wheel, and an escapement cooperating with said impeller and said counting wheel and adapted to be rocked by a lobe of said impeller and to contact a lobe of said counting wheel to complete a counting movement thereof.

6. In a coin sorting and counting mechanism having a hopper for unsorted coins, a track for receiving and moving therealong an individual coin, coin receiving slots spaced along said track, each slot being of a width corresponding to the diameter of a coin being sorted and being adapted to separate from said track coins of a particular denomination; the improvement comprising means cooperating with each of said coin receiving slots for counting the coins after each coin has been individually separated at said track comprising a frame, an impeller mounted on said frame and having a plurality of coin receiving pockets therein, said impeller having coin contacting lobe portions intermediate said coin receiving pockets for holding a coin for entrance to a succeeding pocket, a counting wheel having equiangularly spaced lobes thereon and being adapted to be rotated through a partly complete counting cycle by a coin disposed in said pocket and between adjacent lobes on said counting wheel, and an escapement cooperating with said impeller and said counting wheel and adapted to be rocked by a lobe of said impeller and to contact a lobe of said counting wheel to complete a counting movement thereof.

7. In a coin sorting and counting mechanism having a hopper for unsorted coins, a track for receiving and moving therealong an individual coin, coin receiving slots spaced along said track, each slot being of a width corresponding to the diameter of a coin being sorted and being adapted to separate from said track coins of a particular denomination; the improvement comprising means cooperating with each of said coin receiving slots for counting the coins after each coin has been individually separated at said track comprising a frame extending below said track, a guide on said frame, an impeller having a plurality of coin receiving pockets therein, said impeller having coin contacting lobe portions intermediate said coin receiving pockets for holding a coin for entrance to a succeeding pocket, a counting wheel having equiangularly spaced lobes thereon and being adapted to be rotated through a partly complete counting cycle by a coin disposed in said pocket and between adjacent lobes on said counting wheel, an escapement cooperating with said impeller and said counting wheel and adapted to be rocked by a lobe of said impeller and to contact a lobe of said counting wheel to complete a counting movement thereof, and a counting mechanism secured to said frame and driven by said counting wheel.

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