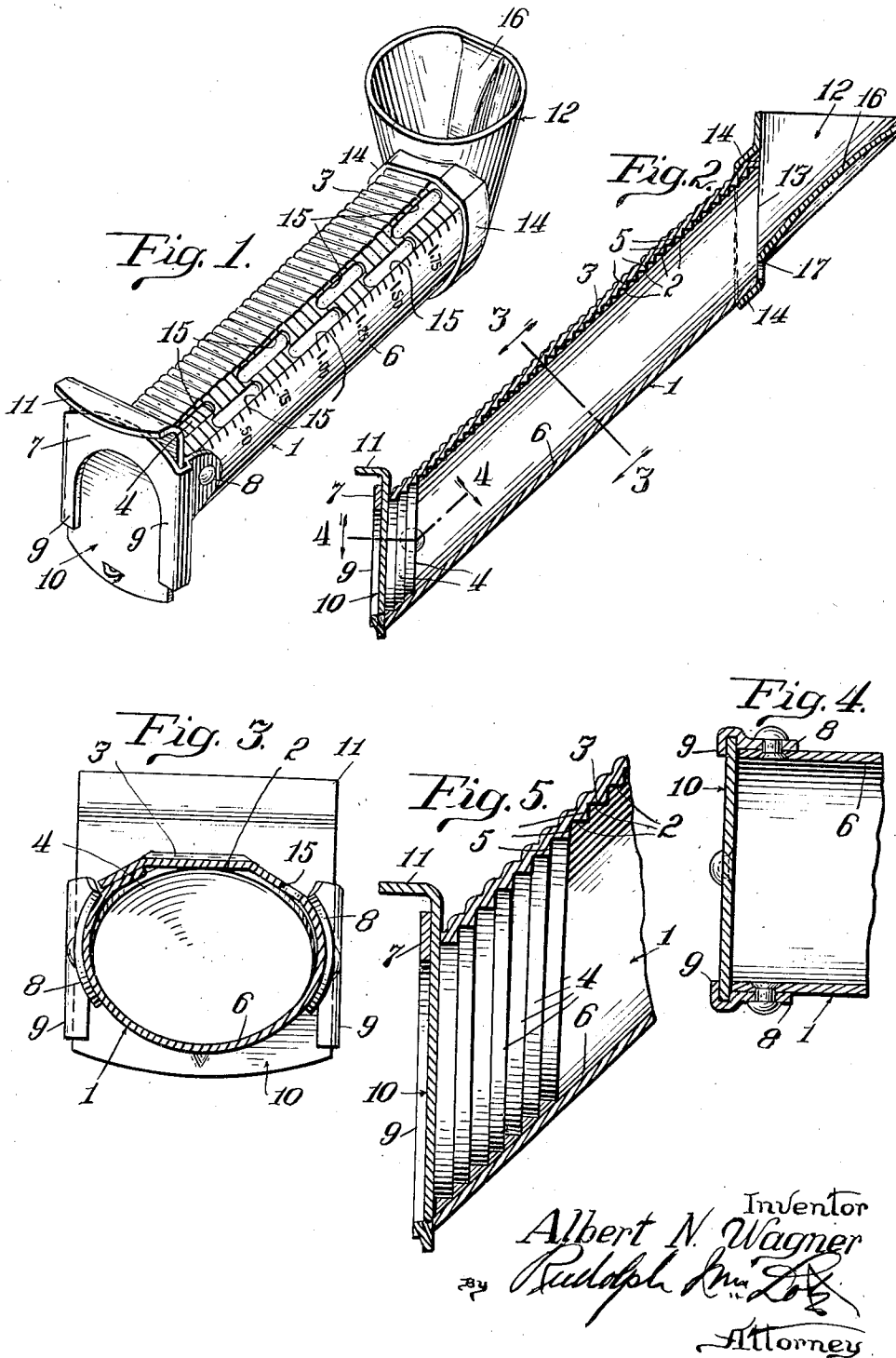


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COIN COUNTING DEVICE

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The present invention relates to improvements in means for receiving and automatically counting coins of given denominations and has for its main object to provide a very simple, cheap, efficient and portable device of this character which may be made in sizes to receive coins of respectively different denominations.

A further object of the invention is to provide a coin receiving and counting device which will receive and retain only the predetermined number of coins desired to be received therein for purposes such as subsequently disposing said coins in conventional coin wrappers used by banks etc. etc.

A very essential object of the invention is to provide a device of the character defined, which may be held in the hand in a substantially predetermined position for the reception of coins in its upper end portion, to effect the automatic counting and positioning of said coins in a substantially stacked relation, regardless of the variations in thicknesses of the coins of the denomination for which the particular device is adapted.

Other objects of the invention will be readily understood from or are particularly set forth in the following specification.

A suitable embodiment of the invention is illustrated in the accompanying drawing, wherein:

Fig. 1 is a perspective view of a coin receiving and counting device constructed in accordance with the invention.

Fig. 2 is a central vertical longitudinal sectional view of the same.

Figs. 3 and 4 are, respectively, fragmentary detail sectional views on an enlarged scale taken on the lines 3—3 and 4—4, respectively of Fig. 2.

Fig. 5 is a fragmentary detail vertical longitudinal sectional view of the lower end portion of the device as shown in Fig. 2.

The device of the present invention comprises a tube 1, composed of a suitable material, which is substantially elliptical in cross section, the inner largest diameter of said tube being substantially equal to that of the coins of a given denomination which the tube is intended to receive.

In the instance illustrated we will assume that the device is adapted to receive the coins commonly known in this country as "nickels."

The longer diameter of the tube 1 is slightly greater than the diameter of the coin of the denomination for the reception of which the tube is designed. The shorter diameter of the tube is such, in the instance illustrated, that it is equal to the vertical leg of an equilateral right

angled triangle, the hypotenuse of which is of a length equal to the longer diameter of said tube. This is further explained hereinafter.

The tube is adapted to be normally disposed at an angle of 45 degrees, more or less, to a horizontal plane and in such position that the vertical plane of the axis of the tube is coincident with its shortest diameter and is perpendicular to the said horizontal plane.

Along the upper wall of the tube, when so positioned, and disposed in intersecting relation to the vertical plane of the axis of said tube, there is provided a series of spaced apart recesses 2 extending transversely of the longitudinal axis of the tube with the walls of said recesses disposed at angles of 90 degrees to each other and at an angle of 45 degrees to the axis of the tube. This specified relation of the walls of said recesses to the longitudinal axis of the tube may be changed and varied to an appreciable extent, but for purposes of illustration and description it is assumed that angles of 90 degrees and 45 degrees, respectively, are selected.

By reference to Fig. 5, wherein the recesses 2 are shown most clearly, it will be noted that each recess has a top wall 3 disposed in a horizontal plane and which is of a length equal to the normal thickness of a coin 4, such as a nickel, adapted to be received within said tube 1. The vertical walls 5 of said recesses are vertically disposed and are spaced equidistantly from each other throughout the length of the tube. The wall portion 6 of the tube 1 diametrically opposed to the recesses 2, is smooth and affords support for the edges of the nickels 4 shown, which, when inserted into the tube, slide down along the peripheral wall thereof until the lower edge of the first coin strikes the closure of its lower end and becomes substantially vertically disposed with its upper edge opposed to the lowermost wall 3.

In the instance illustrated, the lower end of the tube is cut away at an angle of 45 degrees to the axis of the tube. A closure gate receiving and guiding member 7 is suitably secured by means of flanges or projections 8 to the side wall portion of the tube 1 adjacent its lower end and is equipped with L-shaped vertical side flanges 9 which provide grooves to receive the side edge portions of the closure gate 10; the latter being equipped with a digitally engageable flange 11 at its upper edge for digital manipulation to open and close the discharge end of the tube for effecting discharge by gravity of the coins disposed within the same.

Mounted upon the upper end portion of the tube 1 is a funnel 12. The latter being equipped with a discharge opening 13 leading into the tube, said opening being smaller than the open end of the tube opposed thereto. Said opening is bordered by a flange 14 which telescopically receives the upper end portion of the tube 1 and which is suitably secured thereto.

In the instance illustrated, or as would be true of the structure when designed to receive nickels, the total number of the upper walls 3 of the recesses 2 will be forty, with the lowest one of said walls 3 disposed immediately adjacent the gate 10. The uppermost wall 3 of the series is disposed immediately adjacent the upper extremity of the tube 1. Adjacent to the portion of the wall of the tube equipped with said recesses 2, there are provided slots 15 through which the edges of the coins are visible. A graduated scale is imprinted or otherwise impressed upon the exterior surface of the tube 1 as shown in Fig. 1 to indicate the number of nickels contained within the tube which are visible through said slots 15.

The lowermost portion 16 of the wall of the funnel 12 as shown in Fig. 2, is preferably bowed inwardly to the point at which said wall meets the shoulder portion 17 extending downwardly to meet the said flange 14.

In use the device is held in substantially the position shown in Fig. 2 and nickels may be dropped into the funnel 12 and when delivered into the tube, will be positioned to slide along the end between the side wall portions thereof until the first of said coins strikes the said gate 10. Said coin will then become disposed in contact and parallel with said gate 10 with its upper edge portion disposed closely adjacent to and opposed to the horizontal shoulder of the lowermost recess 2. The next succeeding coin will become disposed substantially parallel with the first-mentioned coin, or, in the event that the first coin should be slightly thinner than the second-mentioned coin, the latter will become very slightly angularly disposed relatively to the same with its upper edge portion abutting the lowermost vertical shoulder of the next lowermost recess 2 next behind the preceding coin. As each coin reaches the lower limit of its travel within the tube, it will become substantially vertically disposed and the upper edge of each of said coins, whether of normal thickness or worn, will become disposed in one of the recesses 2; it being impossible, by reason of the cross-sectional dimensions of the tube, for any coin to become disposed in any other relation to other coins or to the recesses 2 than is clearly illustrated in Fig. 5.

As the coins slide downwardly in the tube, their side edge portions contact with the side wall portions of the tube with the faces of the coin disposed substantially parallel with the axis of the tube and at an angle of about forty-five degrees to a vertical plane extending transversely of the tube and with which the gate of the latter and coins previously fed into the tube are approximately parallel. When the lower edge portion of the traveling coin strikes either the gate or a face of a previously inserted coin, said lower edge will be projected downwardly, thus rotating the coin through a short arc about a horizontal axis disposed transversely of and in approximately intersecting relation to the axis of the tube. Following this short arc rotation of the coin, its movement becomes arcuate about

the lowermost edge portion of the coin as a fulcrum until the upper edge portion of the coin is disposed in the recess 2 immediately behind that which contains the upper edge portion of the next preceding coin.

As the upper substantially horizontal wall of each recess 2 is the same width as the thickness of a new or unworn coin of the denomination for which the tube is intended, and the distance between said upper wall and the substantially vertically opposed point in the lowermost wall portion of the tube is only very slightly greater than the diameter of a new coin of the said denomination, it follows that no recess 2 can receive the upper edges of two coins unless the latter are worn down to about half their initial thickness, but as such coins are never in circulation, the same being taken out of circulation as soon as their faces are so worn as to be unreadable, there is no danger of more than one coin being received for each recess 2. Experience has shown that even if a number of badly worn coins are fed successively into the tube they become progressively canted to a greater degree within the tube with their lowermost edge portions spaced less distance from the gate than the vertical shoulders of the corresponding recesses 2, but even in such extreme cases, the total number of coins capable of being received within the tube is limited to the number of horizontal shoulders of the stepped formation formed by the recess 2.

The elliptical cross sectional shape of the tube is very essential because of the canted position of the coins which renders necessary that the vertical diameter of the tube shall be slightly greater than that of the coins in the planes of the latter or in the planes parallel with the gate while the horizontal diameter must be slightly greater than the diameters of the coins. If the tube were cylindrical and of the last-mentioned diameter, then the stepped upper wall portion thereof containing the recesses 2 would be required to project inwardly from the adjacent parts of the tube a distance sufficient to space the same an equal distance from the bottom or diametrically opposed portion of the tube, as is true of the elliptical tube. If this were not done the angularly disposed coins would not engage in the recesses 2.

The last coin of the entire number is disposed practically in such close proximity to the mouth of the funnel as to constitute a closure for the latter. The lower edge portion of said last coin will be disposed in overlapping relation to the shoulder 17 and regardless of how many relatively thin coins of the given denomination are fed into the tube, there will not be enough space between the uppermost of said coins and said shoulder 17 to receive another coin of the said denomination.

In the instance illustrated, coins in excess of the number (forty) intended to be received within the tube, will remain disposed upon the lower wall of the funnel with the upper edge portion thereof overlapping the front substantially vertical wall portion of the funnel. When an excess number of coins is fed into the funnel, the tube may be inverted to discharge said excess coins from the funnel without causing any of the predetermined number disposed within the tube to be discharged. This is due to the fact that upon inverting the tube 1, the pressure of the entire stack of coins is exerted against the upper coin of the tube to firmly compress the same against

said shoulder 17, thus preventing said coin from being displaced or canted to become disengaged from the uppermost recess 2.

The coins are discharged by gravity very easily and quickly by opening the gate 10, as will be obvious.

I claim as my invention:

1. A coin receiving tube of substantially elliptical cross-section and having its greater diameter substantially equal to the diameter of coins of the denominations intended to be received in said tube, the tube being equipped with a bottom wall extending angularly to the tube axis, a series of equally spaced apart shoulders disposed midway of a wall of greater radius of said tube throughout the length thereof and parallel with said bottom wall and equally spaced from the other wall of larger radius, a series of similar shoulders extending transversely to and alternated with said first named shoulders and to said bottom wall and each thereof equal in width to the normal thickness of said coins, said first named shoulders constituting stops adapted to engage face portions of coins and said second named shoulders adapted to become opposed to edge portions of successive coins dropped into said tube, the last-named shoulders being spaced from the opposed wall of the tube a distance substantially equal to the coin diameter, said bottom wall functioning to cause the first coin dropped into the tube to rest upon said bottom wall over its entire face and said first coin and succeeding coins being caused by the preceding coin to become disposed successively along an edge portion in face contact with said first-named and substantially in edge contact with said second-named shoulders.

2. A device of the type specified comprising a noncylindrical tube having a diameter substantially equal to that of coins of a given denomination adapted to be received in said tube and being of less diameter perpendicularly of its first-named diameter, a series of substantially equal shoulders disposed upon an inner wall of the tube spaced from each other a distance substantially equal to the normal thickness of said coins and extending angularly of the axis of the tube in intersecting relation to the plane of the shorter diameter of the latter, said tube being open at its upper end and equipped at its lower end with a coin face engaging means for causing the first coin deposited in the tube to be disposed substantially parallel with the plane of the lowermost of said shoulders.

3. A device of the type specified including a tube of substantially elliptical cross section having its largest inner diameter substantially equal to that of a coin of given denomination, said tube open at its upper end and equipped with a closure at its lower end disposed in a plane extending angularly to the axial plane of longest diameter of said tube and perpendicularly to the axial shortest diameter plane of said tube, and a series of coin edge supporting shoulders disposed parallel with the plane of said closure and which are of equal depth and spaced from each other a distance equal to the normal thickness of the coin disposed along the inner wall of said tube and in intersecting relation to the shortest diameter axial plane of said tube, the said shortest diameter being such that coins engaged with said shoulders and disposed substantially parallel with said closure plane will bear upon the portion of the wall of the tube opposed to said shoulders.

4. A device of the type specified including a coin receiving tube adapted to be disposed angularly to a horizontal plane and which is open at its upper end, a closure for the lower end of the tube disposed to extend substantially perpendicularly to said horizontal plane and extending angularly of the tube axis, said tube being of less inner diameter in the vertical plane of its axis than a coin of given denomination adapted to be received therein and being of inner diameter substantially equal to that of the coin in the plane of the tube axis extending transversely of said vertical plane, the upper inclined wall of said tube equipped with a series of equal and equally spaced apart shoulders disposed in substantially vertical planes parallel with said closure plane, said shoulders spaced from each other a distance equal to the normal thickness of coins of said denomination and cooperating with the closure and the diametrically opposed portion of the tube to cause coins inserted successively into said tube to become disposed substantially parallel with each other with the upper edge portion of each of said coins engaged with one of said shoulders.

5. A device of the kind specified comprising a substantially elliptical tube equipped along the inner face of a wall thereof in intersecting relation to the shortest diameter axial plane of said tube with a series of equal shoulders disposed at an angle of substantially forty-five degrees to the tube axis, said shoulders spaced from each other a distance substantially equal to the normal thickness of coins of a given denomination to be inserted into the open end of said tube and being so spaced from the diametrically opposed wall portion of said tube as to cause said coins to be engaged along an edge portion of each by one of said shoulders when disposed substantially parallel with the latter and engaged along diametrically opposed edge portion upon said opposed wall portion, and means at the bottom of said tube to cause the first inserted coin to be disposed in said last-named position, the largest inner diameter of said tube being substantially equal to the diameter of the coin.

6. A device of the type specified comprising a coin receiving tube having a large diameter and a smaller diameter disposed perpendicular to each other, said tube adapted to be disposed at an incline to a horizontal plane and equipped at its lower end with a closure gate which is vertically disposed when said tube is inclined as aforesaid, and which extends angularly to the tube axis, said tube having its larger diameter slightly greater than that of the coins intended to be received therein, a saw-tooth rack mounted in the uppermost portion of said tube parallel with its axis and presenting successive shoulders disposed perpendicularly to the plane of the closure gate and each of a length equal to the normal thickness of one of said coins, the other shoulders of said rack being parallel with the plane of said closure gate and opposing the upper edge portions of said coins, said first-named shoulders being spaced from lowest points in the tube intersected by the planes of the second-named shoulders a distance substantially equal to the larger diameter of the said tube.

7. A device of the type set forth comprising a tube adapted to be disposed at a given angle to a horizontal surface to cause coins inserted into the open upper end thereof to move by gravity into its lower end, said tube equipped at its lower end with a stop operating to cause the first coin

deposited in said tube to become vertically disposed automatically, the lateral diameter of the said tube being substantially equal to the normal diameter of coins of the denomination adapted to be received therein, the upper and lower wall of said tube being spaced apart a distance less than the diameter of said coins, one of said last-named walls being equipped with a series of equal step formations through its length, each having a horizontally disposed and a vertically disposed wall when said tube is disposed at said angle, said horizontally disposed walls being then spaced from a vertically opposed point in the opposite wall a distance substantially equal to the said coin diameter and becoming opposed to circumferential edge portions of successively inserted coins, the length of each of said horizontal walls being substantially equal to the normal thickness of a said coin, said vertical walls being parallel with said closure and the lowest one of the series spaced therefrom a distance equal to the length of said horizontal walls and serving to cause coins of the same or different thicknesses to become substantially equally spaced apart and limiting the number of coins receivable in the tube to equal the number of said step formations.

8. A coin receiving tube of substantially ellip-

tical cross-sectional shape equipped with a rack mounted midway between the side edges of a wall of greater radius of said tube, said rack presenting a series of alternate V-shaped projections and recesses the faces of which are disposed at substantially equal angles to the tube axis, one face of each of said projections being of a width equal to the normal thickness of coins of the denomination intended to be received in said tube and the number of said projections being equal to the predetermined number of coins to be received within said tube, the greater diameter of the latter being substantially equal to the diameter of said coins, said tube equipped with a bottom wall extending parallel with the other faces of said projections and adapted to function to cause the first coin dropped into the tube to lie parallel with said wall and said last-named faces of said projections and cause an edge portion thereof to engage a face of the lowermost V-shaped formation of said rack non-parallel with said bottom wall each succeeding coin being automatically disposed substantially parallel with the next preceding coin and with an edge portion thereof disposed in engagement with the next higher face of the rack parallel with said bottom wall.

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