

Jan. 10, 1967

N. KARP

3,297,242

APPARATUS AND METHOD FOR HANDLING COINS

Filed April 15, 1965

FIG. 1

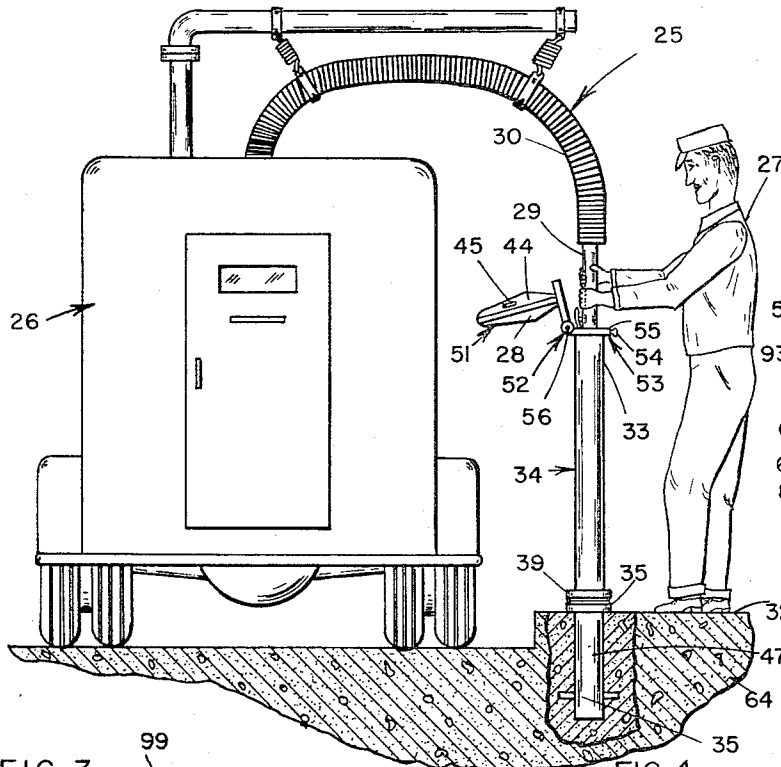


FIG. 2

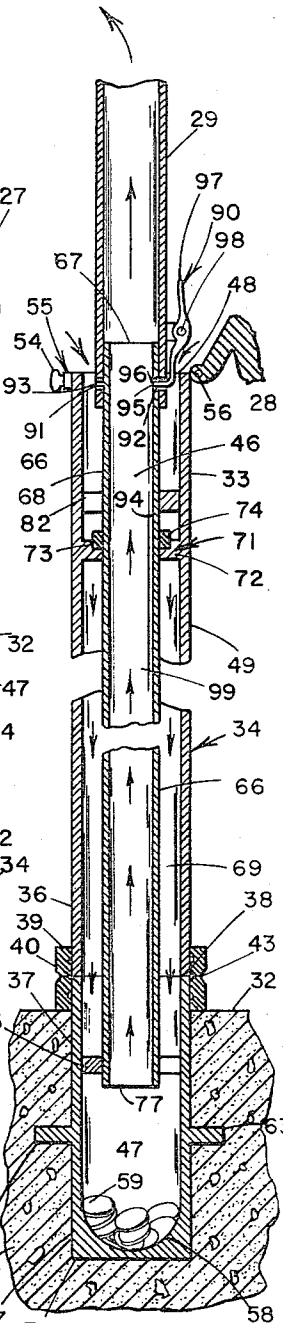


FIG. 3

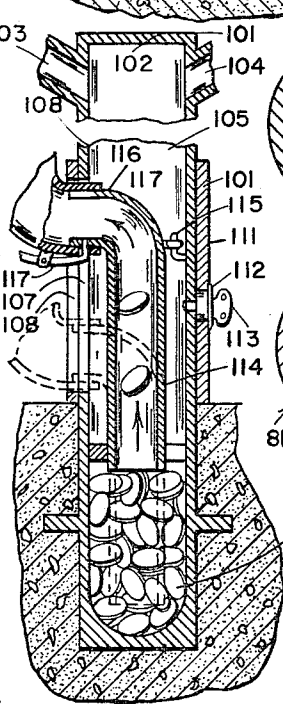
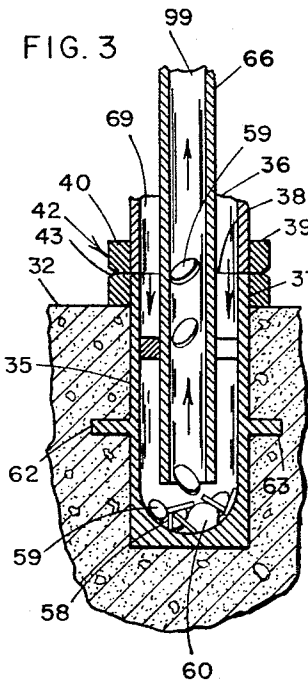


FIG. 4

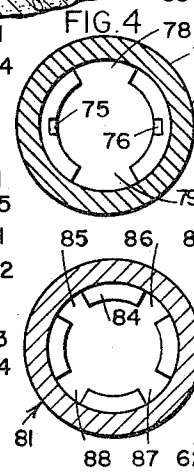
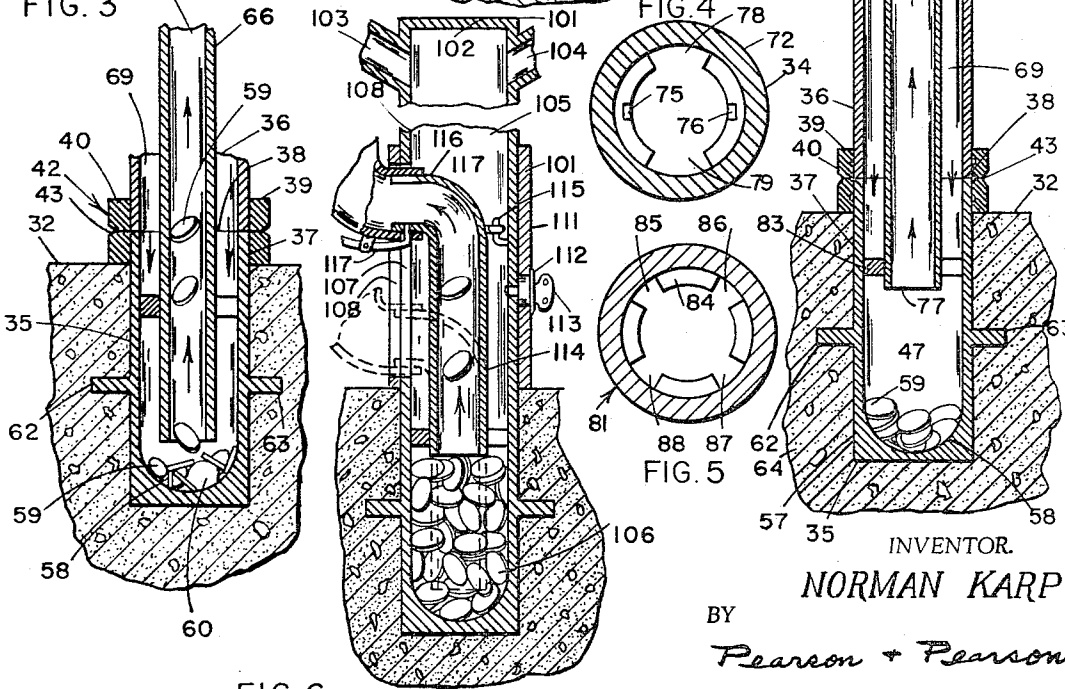


FIG. 5

FIG. 6



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**APPARATUS AND METHOD FOR
 HANDLING COINS**

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 Filed Apr. 15, 1965, Ser. No. 448,421
 14 Claims. (Cl. 232-1)

This invention relates to a method and apparatus for handling coins, especially to the safeguarding of coins which are received into and collected from parking meters or the like.

It has heretofore been proposed to mount parking meters on hollow posts and to collect the coins therefrom by mobile suction collectors. For example, in U.S. Patent 2,869,777 to Share of January 20, 1959, a post mounted meter is disclosed in which a coin receptacle is slidably mounted within the upper interior of the post, the receptacle being moved upwardly for suction extraction of the coins to a mobile machine. A coin receptacle is transversely mounted within the upper portion of the meter post, for the same purpose, in U.S. Patent 2,869,778 to Share of January 20, 1959. In U.S. Patent 3,118,597 to White of January 21, 1964, a suction hood is disclosed which covers the meter door, while the door is unlocked to permit the coins in the meter to pass into the hood and thence into the suction conduit of the mobile collector. All of these prior art devices call for a coin receptacle in the upper part of the post to enable gravity to initially move the coins in the receptacle down into the suction environment, this having the disadvantage that a thief may attach a rope from his vehicle to the post, break off the post, and carry it away for subsequent removal of the coins.

It has also been proposed, in U.S. Patent 2,964,237 to Henderson of December 30, 1960, to provide a casing embedded in the ground alongside the embedded lower end of a parking meter post, the coins being guided laterally from the post to a receptacle in the casing and the receptacle being manually liftable from the casing. Such a liftable and lockable receptacle has heretofore been considered necessary in order to lift coins upwardly out of an underground casing, since upward suction extraction of relatively heavy coins has not been taught prior to this invention.

In this invention, the coins are guided downwardly through the meter post into a coin depository located within the lower end of the post, the lower end being embedded to a substantial distance below ground level. Preferably, there are no coin discharge openings at or near ground level, or intermediate of the height of the post, so that coins may be removed only by passing upwardly back through the post and out of the open upper end. Applying suction to the upper end of the large diameter meter post itself would have no lifting effect on the coins because there would be no atmospheric pressure on the coins to force them upwardly. The invention therefore provides for a combined suction and agitator tube coaxially positioned within the post to form a central suction conduit and to form an annular air passage around the tube, within the post. The tube is arranged to be connected to the suction conduit of the mobile collector, and to be vertically reciprocated by the operator during the suction extraction process, this tending to peel off the uppermost coins in the pile, a few at a time. Too much pneumatic pressure may cause a bundle of coins to block the passages and too large an area of flow passage may result in poor suction extraction, but the device as disclosed herein has been found to give unusually fast and efficient collection results. The post is provided with a shear groove and the tube is normally above ground level within the post in order that

lateral forces will break the post at about ground level, leaving the depository untouched and incapable of extraction of coins except by a slow manual removal of one coin at a time.

The principal object of the invention is therefore to provide a combined pneumatic and mechanical method and apparatus for handling coins in which the coins are safeguarded in an underground depository within a parking meter post, and can be removed only by suction extraction, accompanied by mechanical agitation, into a mobile coin collector.

Another object of the invention is to provide a suction tube within a parking meter post, which can be reciprocated axially in the ground-embedded lower end of the post to peel off a few coins at a time from a pile of coins to permit suction extraction of coins up the tube to take place.

A further object of the invention is to provide an improved coin handling device in which coins from a meter fall by gravity down into a coin depository directly under the meter post and are removed therefrom by pneumatic means operable from above ground level, the post having shear means to break cleanly under lateral force, leaving the coins and depository in place under ground.

Other objects and advantages of the method and apparatus of the invention will be apparent from the claims, the description of the drawing, and from the drawing, in which

FIGURE 1 is a side elevation in section, showing the device of the invention in combination with a mobile coin collector and showing the suction and agitation step of the method;

FIGURE 2 is an enlarged side elevation in half section of the coin handling apparatus of the invention, with the agitator tube in normal position;

FIGURE 3 is a fragmentary view similar to FIGURE 2, showing the agitator tube in collection position within the coin depository;

FIGURE 4 is a detail, enlarged plan view showing a support ring for the tube;

FIGURE 5 is a view similar to FIGURE 4, showing a spacer ring for the tube; and

FIGURE 6 is a fragmentary view, similar to FIGURE 2, showing another embodiment of the invention.

As shown in FIGURE 1, the coin handling apparatus of the invention includes a conventional mobile suction coin collector 26 of the type described in detail in the above mentioned patents. In such devices, the operator 27 does not have access to the coins but simply applies a suction hood to each coin receiving device 28, the hood mechanism automatically unlocking the coin depository door, permitting the coins to fall into the mouth of the suction conduit 29. The coins then travel through the flexible suction tube 30 into the interior of the armored truck 26 for automatic sorting, proving, counting, and delivery.

The coin receiving devices 28, such as parking meters, are conventionally fixed to the top of a hollow meter post, the lower end of the post being embedded below the level of ground 32, and each meter or post having an unlockable closure above ground level for connection with conduit 29.

In this invention, each parking meter, or other similar device 28 is mounted at, or proximate, the upper end 33 of a hollow vertical post 34, the post preferably being of metal and having a predetermined inside diameter, or inside area, in section, such as an inside diameter of two inches. The inside diameter of post 34 is preferably uniform. The lower end 35 of the post is embedded below the level of ground 32 for a substantial distance, such as about eighteen inches, and the post upstands above the level of ground 32 to a convenient height, such

as thirty-six inches. While post 34 can be one piece, it is preferred that it be of two pieces 36 and 37, meeting at a butt joint 38, the joint 38 being encircled by the metal sleeve 39 welded, or otherwise secured, thereto, at 40.

Sleeve 37 is provided with annular shear groove means 42 in the form of an annular groove 43, extending around the sleeve as a shear, or fracture, line. If a thief connects the post part 36 to his vehicle by a rope and attempts to pull the post out of the ground, the sleeve 39 will break at the groove 43, leaving a clean rim at the joint 38 and leaving the lower end of the post still embedded in the ground to receive a replacement part 36.

Each coin receiving device 28 is provided with a suitable passage 44 connecting its coin receiving slot 45 with the interior 46 of hollow post 35, so that coins deposited therein will fall by gravity down into the underground coin depository 47 formed within the lower end 35 of the hollow post 34. In the device illustrated, the upper end 33 of post 34 includes the opening 48. The meter device 28 covers the opening 48, and the coins pass from the device 28 into the opening 48. It will be understood, however, that one or more devices 28 may be mounted offset from the upper end of post 34, the upper end may be permanently closed and the coins may be guided laterally into the interior of the post through side openings in the wall 49 of post 34, all within the scope of the invention. Thus in the illustrated embodiment openable closure means 51, for covering opening 48, consists of the coin receiving device 28 itself which is mounted on one side of the upper end 33 of post 34 by pivot means 52 and connected to the opposite side of the upper end 33 by lockable means 53. Thus the device 28 may be unlocked by inserting a suitable key 54 in the lock 55 and tilted out of the way on the hinge pivot 56 during the coin collection step and then re-positioned and locked to cover the opening 48.

The lower end 35 of post 34 is preferably closed by a unitary integral closure 57, closure 57 having an inner curved, cup-shaped face 58, which tends to guide the coins 59, dropped into a pile of coins 60 in underground coin depository 47 from the periphery of the depository toward the axial, longitudinal center line of the post. Lower end 35 is also provided with a plurality of laterally projecting integral lugs 62 or 63, which are embedded in the cement 64 filling the post hole to anchor the post firmly underground.

A hollow, elongated, combined suction and agitator tube 66 extends axially within hollow vertical post 35, preferably of a length sufficient to reach from the level of the opening 48, at the upper end 33 to about the level of ground 32 proximate the level of the top of the underground coin depository 47. As shown, the opening 67 at the upper end 68 of tube 66 is slightly above the level of the opening 48 to permit easy access for attachment of the suction conduit 29. The outside area, in section, of tube 66 is less than the inside area in section of post 34, for example an outside diameter of one and three-eighths inches, to provide an annular air passage 69 between the tube and post.

Support means 71 in the form of an apertured ring 72 (FIGURE 4) and at least one protuberance, or lug, 73 or 74, extending laterally outwardly from tube 66, retains the tube in the normal position shown in FIGURE 2. Ring 72 is welded, brazed, or otherwise fixed within post 35, in annular passage 69 and includes at least one recess 75 or 76 for seating protuberances 73 or 74 to support the tube 66 in its normal position with its open lower end 77 poised above the level of the pile of coins 60. Ring 72 also includes at least one slot, or aperture 78 or 79 to permit atmospheric air to pass therethrough and to permit the protuberances 73 or 74 to pass therethrough when the tube is slightly lifted to unseat the protuberance and is then turned through an angle of 90° about its longitudinal axis.

Spacer means 81 is also provided in the form of at least one, and preferably two, longitudinally spaced apart, spacer rings 82 and 83, each fixed within post 35, in passage 69, by welding, brazing, or the like. Each spacer ring has an interrupted inner periphery 84 for maintaining tube 66 coaxial and concentric within post 35, the ring being slotted, or apertured as at 85, 86, 87 and 88 in each quadrant therearound to pass atmospheric air (FIGURE 5). One ring 82 is preferably fixed within post 35 above support ring 72, the lugs 73 and 74 preventing the tube from being drawn out of the post, and the other ring 83 is fixed within post 35 just below ground level to define the top level of coin depository 47.

The upper end 68 of tube 66 and the terminal end of conduit 29 are provided with cooperable latching means 90, which may be of any convenient type that will form a detachable suction joint. Preferably means 90 includes a pair of longitudinally extending slots 91 and 92 in the conduit 29, slot 91 receiving a lateral pin 93 projecting from one side of tube 66. The other side of the wall 94 of tube 66 includes a hole 95 for receiving the pin 96 of a spring-loaded latch detent 97 pivoted to the conduit 29 at 98, pin 96 passing through slot 92. The tube is thus detachably fixed to the conduit so that the tube may be turned about its axis by forces applied to the conduit, and may be reciprocated vertically during the suction step without dropping off the conduit.

In operation, the collector 26 is driven to each of a plurality of devices 28. In each device 28, the coins have accumulated in the underground depository 47 within the post, having dropped by gravity down tube 66. The operator 27 opens the closure means which gives access to the upper end of the tube 66, as by unlocking and tilting the meter itself, and connects the conduit 29 to the tube 66. The tube 66 is then twisted to release it from its normal position and lowered by the operator until its lower rim 77 engages the uppermost layer of coins in the depository. The vertical reciprocation of the agitator tube 66 causes the successive uppermost layers of coins to peel off, a few at a time, to travel upward through the interior 99 of the tube under suction extraction, and the pressure of atmospheric air from annular passage 69. It has been found that each underground depository may be so emptied in less than forty seconds. Thereafter, the tube 66 is replaced on its support ring 72, the latching means disconnected, the coin discharge opening covered, and locked.

The embodiment of FIGURES 1-5 makes use of conventional metal pipe with the open upper end of the tube 66 serving as the coin entrance and discharge opening, and the parking meter serving as the lockable, openable, closure covering the opening. However, it will be understood that it is within the scope of the invention to permit the coins to fall down the annular air passage 69, as well as down the interior 99 of the tube, by providing spider type spacer rings with apertures large enough to pass a twenty-five cent piece.

In FIGURE 6 another embodiment of the invention is shown, in which the hollow meter post 101 includes a closed upper end 102, the coins from each of a pair of meters being guided through the coin passages 103 and 104 to fall down the interior 105 of the post into the underground coin depository 106. The coin discharge opening 107 is in the side wall 108 of post 101, just above ground level, and consists of an elongated slot which registers with a similar slot 109 in a sleeve 111 encircling the post. Sleeve 111 is turnable about the axis of the post and lockable by a lock 112, and key 113, in a position covering the opening 107. A hollow, elongated agitator tube 114, corresponding to tube 66, but relatively short, extends axially within post 101, the tube being supported on support means 115, such as a hook, and connected by its upper end 116 to the suction conduit 29 by suitable latching means 117. The tube 114 is shown in full lines extracting and agitating the pile of coins, and,

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in dotted lines, reaching down to the bottom of the pile within the depository.

The full length tube 66, built into the post 34, is preferable, since collection takes place at waist level without repeated bending on the part of the operator. An inside diameter of one and one-quarter inches for tube 66 has been found to be satisfactory, since a smaller diameter may not pass quarters, and a larger diameter may tend to either not extract properly, or to plug up with a pack of coins.

I claim:

1. Coin handling apparatus comprising a hollow vertical post having its lower end embedded for a substantial distance below ground level to form an underground coin depository within said end, said post having a predetermined inside area in section, and said post upstanding, above ground level to an upper end;
 - at least one coin-receiving device firmly secured to said post proximate the upper end thereof, said apparatus having a coin-receiving slot communicating with the interior of said post for passing coins downwardly therewithin into said underground depository;
 - openable closure means covering a coin discharge opening located above ground level in said post;
 - a hollow, elongated agitator tube extending axially within said post, said tube having a predetermined outside area in section less than the inside area of said post, to form an annular air passage therebetween, having a lower end for successively agitating the uppermost coins in said depository, and having an upper end for connection to the suction conduit of a mobile suction coin collector through said coin discharge opening, whereby said coins are safeguarded in said underground depository but are removable therefrom when said closure means is opened, suction applied to the upper end of said tube and the lower end of said tube is reciprocated axially within said depository to peel off the successive uppermost layers of said coins.
2. Coin handling apparatus as specified in claim 1 plus means fixed within said post for normally spacing said tube at a uniform distance from the inside face of said post to define said annular air passage and normally supporting said tube with its upper end proximate the level of the bottom of said coin-receiving apparatus and with its lower end proximate ground level at the level of the top of said underground coin depository.
3. Coin handling apparatus as specified in claim 2 plus an annular shear groove means extending around said post proximate ground level to form a fracture line proximate the level of the lower end of said tube whereby attempts to pull said post laterally out of the ground result in said post breaking at said groove with the broken post portion and tube falling away, leaving the underground depository embedded in place.
4. Coin handling apparatus as specified in claim 1 plus a closure integral with the lower terminal end of said post, said closure having a rounded, cup-shaped inner face for guiding coins by gravity from the periphery of said depository toward the central axis thereof.
5. Coin handling apparatus as specified in claim 1 plus latch means on the upper end of said tube for detachable connection to a suction conduit on said mobile suction coin collector whereby agitation of said conduit causes said tube to be similarly agitated.
6. Coin handling apparatus as specified in claim 1 wherein a single said coin-receiving device, in the form of a parking meter, is pivotally mounted on the up-

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per end of said post to form said openable closure means

and locking means, automatically openable by connection with said mobile suction coin collector, is associated with said meter to permit the same to be unlocked and tilted on its pivot out of the way during suction coin collection.

7. The method of handling coins, deposited in a coin operated device mounted at the top of a ground-embedded, hollow post, by means of a suction tube, said method comprising the steps of

permanently mounting said suction tube within said post for axial reciprocation therewithin; guiding coins deposited in said device to drop by gravity downwardly through said hollow post into the portion thereof below ground level, to build up a pile of coins therein, periodically removing the coins, so stored within the underground portion of said post, pneumatically, upwardly, a few at a time, through said suction tube to outside of said post for collection, and simultaneously with said pneumatic removal step, mechanically contacting and agitating the said pile of coins with said reciprocable suction tube successively from the uppermost layers thereof to the lowermost layers thereof to segregate a few coins at a time for pneumatic removal.

8. A method as specified in claim 7, wherein said pneumatic removal step includes the steps of

extracting said coins upwardly along a path proximate the central longitudinal axis of said post, by suction, while directing atmospheric air downwardly through said post along an annular path surrounding said first-named path and permanently barring passage along said annular path except to atmospheric air to thereby prevent pilferage and permit extraction of said coins only through said tube.

9. In combination with a mobile, suction coin collector having a suction head with a suction conduit a plurality of identical coin handling apparatuses, fixed at predetermined locations for the reception and collection of coins;

each said coin handling apparatus comprising a hollow, vertical post having its lower end embedded in the ground to form an underground coin depository therewithin, and having its upper end open; a coin receiving device, such as a parking meter movably mounted on the upper end of said post, said device including a passage guiding coins inserted therein into the open upper end of said post to fall by gravity down into a pile of coins in said depository; a hollow, elongated tube normally extending axially within said post from an open upper end at the level of said device to an open lower end at about ground level, said tube forming a suction conduit therewithin and defining an annular air passage therearound with the inner face of said post, apertured spacer ring and support ring means fixed within said annular air passage to detachably support said tube in said normal position but permit the tube to be agitated axially within the lower end of said post when the upper end thereof is connected to the suction conduit of said mobile coin collector.

10. A combination as specified in claim 9 wherein said hollow tube includes at least one laterally extending protuberance thereon normally seated on one of the said rings and said one ring includes a slot for passing said protuberance, whereby a turn of said tube permits it to move downward into said depository.

11. A combination as specified in claim 9 wherein said coin receiving device is tiltably mounted, by pivot means, to one side of the upper end of said post, and lockably mounted, by lock means, to the other side of the upper end of said post,

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whereby said device may be unlocked and tilted away from its position covering the open end of said post to permit said suction conduit to be connected to the upper end of said tube.

12. A combination as specified in claim 9 wherein the portions of said post above ground level and below ground level are of identical cross section but in two parts to form a butt joint proximate ground level, and

a sleeve is fixed around said post to unitize the same at said butt joint, said sleeve having an annular shear groove extending therearound to form a fracture line if said post is laterally broken.

13. A combination as specified in claim 9, plus manually operable latching means on the upper end of said tube for connecting with said suction conduit,

said means including a spring loaded latch detent on said conduit cooperating with a detent aperture in said tube, whereby axial and rotational forces applied to said conduit are transmitted to said tube.

14. Coin handling apparatus comprising a hollow parking meter post having a closed lower end and an open upper end,

a parking meter movably mounted on the upper end of said post to cover said open end, said meter being adapted to guide coins deposited therein into the upper end of said post for gravitational fall into a pile in the lower end thereof;

a combined suction and agitator tube of imperforate

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rigid material, permanently enclosed within and axially movable within said post, said tube having an upper end connectable to a power operated suction source and having a lower end movable within the lower end of said post to agitate coins therein while suction extracting the same up through said tube and tube guide means, fixed within said post and encircling said tube, above the level of said pile of coins, said means including an air passage but barring removal of said coins except through said tube.

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