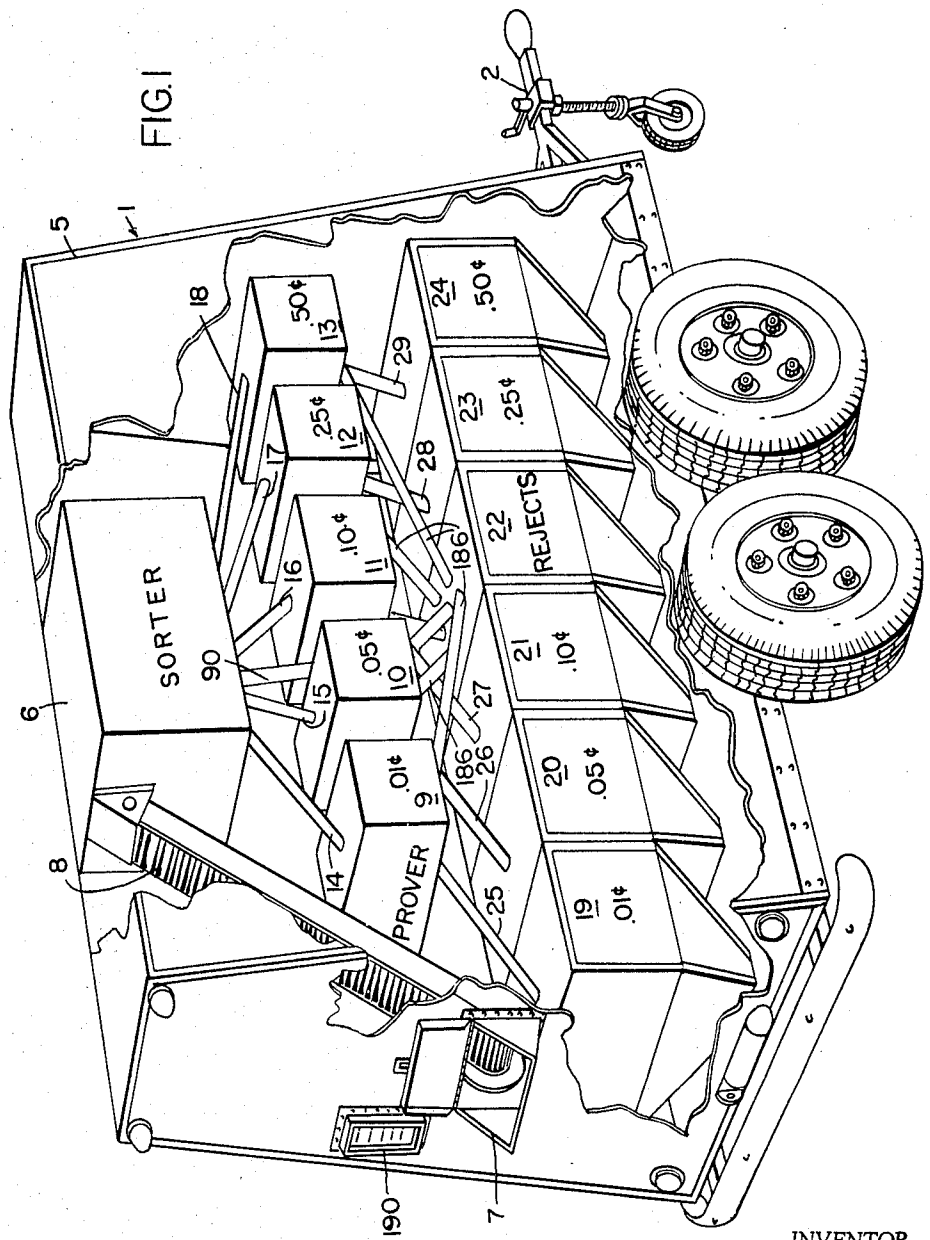
April 19, 1966 R. B. WHITE, JR 3,246,932

COIN CONVEYOR

Original Filed March 9, 1959 3 Sheets-Sheet 1

FIG. 1



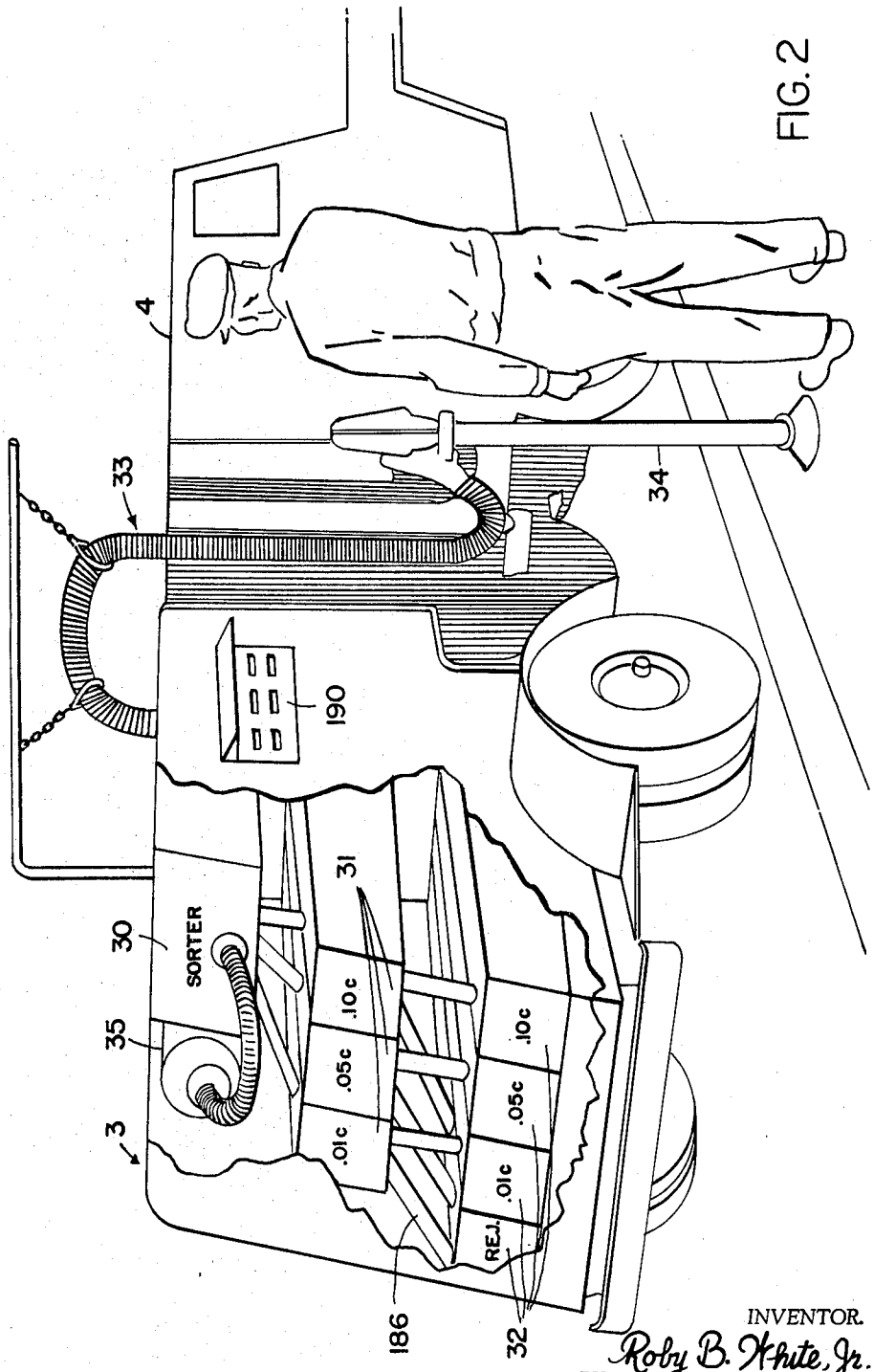
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COIN CONVEYOR

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FIG. 2



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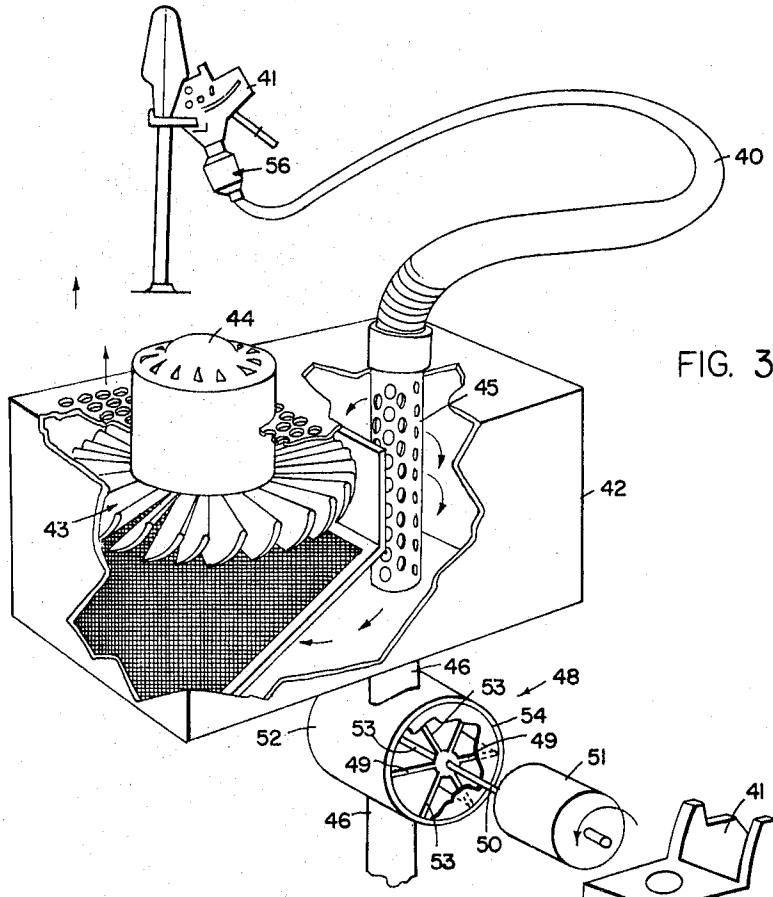


FIG. 3

FIG. 4

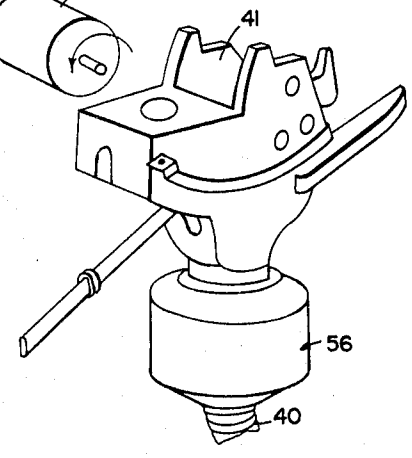
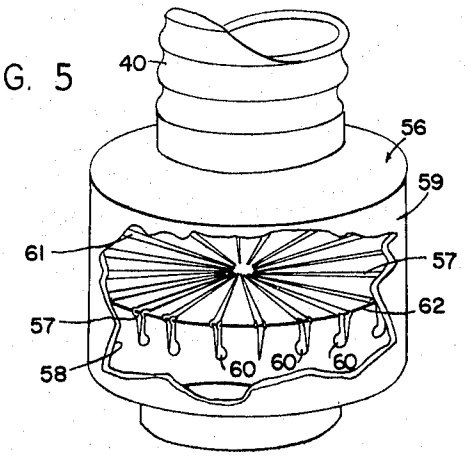


FIG. 5



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COIN CONVEYOR

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Original application Mar. 9, 1959, Ser. No. 798,264, now Patent No. 3,147,839, dated Sept. 8, 1964. Divided and this application June 10, 1964, Ser. No. 384,277
4 Claims. (Cl. 302—2)

This application is a division of application Serial No. 798,264 filed Mar. 9, 1959, now Patent No. 3,147,839 granted Sept. 8, 1964.

This application relates to coin processing devices. More particularly the invention disclosed herein comprises a new and improved coin conveyor suitable for use with coin sorting, authenticating and accounting machines.

My invention is particularly suited for use by such organizations as telephone companies, transit authorities, vending machine operators, banks, parking meter operators, etc. which handle large quantities of coin. At the present time such organizations authenticate and count coins either manually or semi-automatically which are very slow and tedious processes. Typically, coins from telephone pay stations are processed by telephone companies in the following manner: The coins are removed from the telephones in individual boxes which are carried to a central accounting office. At these offices, the boxes are individually opened, and their contents spread out on small tables and inspected manually to separate the counterfeit from the authentic coins. Thereafter, the authentic coins are counted by machines provided for this purpose. Each telephone station must be credited with the dollar value of the authentic coins received by it so that the proprietor of the premises may receive his commission.

In the telephone system, my invention may be used in several ways. As a portable assembly, it may be taken to the side of each station and coins removed from the individual telephones may be proved and counted at or adjacent the premises. Alternatively, the assembly may be located at the central accounting office and receive the contents of the individual boxes as they are brought to the accounting office from the separate stations. By the use of my assembly, individual handling of the coins may be totally eliminated even to the extent of making the bookkeeping entries and drawing the lease or commission checks to the proprietors where the stations are located. This completely automatic handling is made possible because the machine may readily be connected to a conventional punch card process with no intermediate manual steps.

My portable assembly may also be used to collect coins from parking meters in a manner similar to that described above in connection with the removal of coins from individual telephone stations. For this purpose, a pick-up system is provided which is adapted to extract coins from parking meters and feed them automatically into the coin handling machine. This is carried out in a manner which is in effect pilfer proof.

My invention includes various subassemblies which may be arranged in various orders depending upon the particular application for the device. The subassemblies include a pick-up device for introducing coins to the assembly, a sorting mechanism for separating coins of various denominations according to size, a proving device for determining the authenticity of the coins of each denomination, a device for separating authentic but mutilated coins from those in good condition, and a counting mechanism for totaling the coins of each denomination and those rejected as mutilated.

Obviously, the various subassemblies may be used in

different combinations. For example, the portable assembly used to collect coins from telephone stations and parking meters would include a pick-up device for introducing coins to the unit, a sorter for separating the coins of different denomination received by the meters or telephone stations, provers for testing the authenticity of the coins of each denomination received, and the counting mechanism for totaling the value of the coin received. Banks may have several assemblies each one consisting of a sorter, a single prover for the denomination of coin being handled, a multilated coin rejector, and a counter.

It will be obvious from the following detailed description that each of the individual subassemblies have applications distinct from their use in combination with the other subassemblies of the device or machine. For example, the pick-up device may be used alone for the collection of coins from any source where counting or proving is not required.

My invention will be better understood and appreciated from the following detailed description, read in connection with the accompanying drawing, in which:

FIGURE 1 is a prospective view of a trailer containing a coin handling assembly constructed in accordance with my invention;

FIGURE 2 is another embodiment of a portable coin processing assembly particularly suited for use for extracting and handling coins from parking meters;

FIGURE 3 is a prospective view of the vacuum coin pick-up subsystem employed in the portable assembly of FIGURE 2 and illustrating the manner in which coins are removed from a parking meter and directed into the truck;

FIGURE 4 is a prospective view of the coin collecting head shown in FIGURE 3; and

FIGURE 5 is an enlarged detail view, partially in section, of a portion of the assembly shown in FIGURE 3.

The embodiments of my invention shown in FIGURES 1 and 2 are each made portable in that the several subassemblies are incorporated into vehicles. In the embodiment of FIGURE 1, the coin handling apparatus is incorporated into a trailer **1** having a hitch **2** adapted to engage any form of cab. In the embodiment of FIGURE 2, the mechanism is disposed in the trailer or van **3** of a truck **4**. Obviously, the coin handling apparatus may be made portable by mounting it in any type of vehicle.

In the embodiment of FIGURE 1 the apparatus is capable of handling coins of all denominations. Thus, disposed in the compartment **5** is a sorter **6** which is adapted to separate coins according to size and thus in effect divide all of the coins fed to it into groups of different denomination. Coins are fed to the sorter **6** through the hopper **7** formed in the side of the compartment and are carried by a conveyor **8** to the sorter. As will become apparent below, after the coins have been brought to the sorter by the conveyor **8**, they are gravity fed to the various other subassemblies which process the coins.

It will be noted in FIGURE 1 that disposed beneath the sorter **6** are five provers **9**, **10**, **11**, **12** and **13** each adapted to receive coins of a particular denomination. Thus, prover **9** will receive pennies from the sorter, prover **10** will receive nickels, prover **11** dimes, prover **12** quarters, and prover **13** half-dollars. Chutes **14**, **15**, **16**, **17** and **18** are provided to carry the coins separated by the sorter into the respective provers.

While the sorter **6** merely serves to separate the coins according to size and direct them to the separate provers, the provers serve to test the authenticity of each coin directed to them. That is, the sorter will pass a coin to a prover just so long as the coin is of the approximate dimensions of an authentic coin, and the sorter does not

include apparatus for otherwise recognizing counterfeits. The provers, however, cause the coins to resonate at their natural resonant frequency in free air in a half wave circular mode and recognize counterfeits which do not ring within a preselected frequency band width.

Disposed beneath the provers are six bins 19, 20, 21, 22, 23 and 24. Bin 19 is connected by a chute 25 to the prover 9 and will receive authentic pennies from that prover. Similarly, chutes 26, 27, 28 and 29 direct authentic nickels, dimes, quarters and half-dollars from the other provers to the appropriate bins. It will also be noted that each prover has a second chute which terminates in the bin 22 identified as containing counterfeits or rejects. Thus, coins found to be counterfeits by the provers are all directed to the special bin and are separated from the authentic coins contained in the other bins.

The trailer or van 3 shown in FIGURE 2, unlike the trailer in FIGURE 1, is adapted to handle coins of only three denominations. As will be explained in detail below, the arrangement shown in FIGURE 2 is particularly adapted to collect coins from parking meters and thus it is unnecessary for the apparatus to handle quarters and half-dollars. Rather, only pennies, nickels, and dimes which are normally accepted by parking meters need be received by the apparatus. Briefly, the trailer 3 contains a sorter 30, three provers 31 and four bins 32. It will be noted that one of the bins receives rejects while each of the other three bins receive authentic coins from their respective provers.

The trailer 3 also is provided with a coin pick-up assembly 33 which is adapted to gather coins from a parking meter 34 and direct them into the prover 30. A pumping device 35 disposed in the trailer 3 forms part of the pick-up subassembly.

In FIGURES 1 and 2 each of the subassemblies is illustrated in generally box form. In the following section the details of the coin pick up mechanism is described.

Coin pick-up mechanism (FIGURES 3–5)

In FIGURES 3–5 I have illustrated the coin pick-up subassembly used in the trailer 3 shown in FIGURE 2. This mechanism is particularly adapted to remove coins from parking meters and direct them into the sorter 30.

A flexible hose 40 made of plastic, rubber or other similar material interconnects a coin receiving head 41 and a housing 42. The coin receiving head 41 per se does not form part of my invention and may take any one of several forms. The head should be adapted to engage a standard parking meter such as shown at 34 in FIGURE 2, open the meter (not shown), and dump the coins into the tube. The better devices of this type are pilfer proof in that no access to the drawer is available when the head engages the meter. Typically the head may take the form of the coin collecting device shown in the Jones Patent No. 2,779,535 dated Jan. 29, 1957. It is intended that the disclosure contained therein be incorporated by reference into this application.

Within the housing 42 is a standard impeller or suction pump 43 driven by a motor 44 which is adapted to create a flow of air from the coin pick-up head 41 through the hose 40 into the housing 42. The suction action of the impeller 43 is transferred into the hose 40 through the perforated cylinder 45 which extends through the housing 42 and communicates with the hose. The perforations in the cylinder 45 are smaller than any coin and thus while coins are carried through the hose 40 by the air flow from the pick-up head 41, they are not permitted to discharge into the housing 42 but rather are confined to the cylinder 45. Having reached this cylinder, the coins drop by gravity into the chute 46. A screen 47 disposed beneath the impeller 43 prevents small pellets or other matter from impinging upon the impeller blades and damaging them. Any such extraneous matter drawn into the system by the impeller is confined to the housing 42, and may be periodically removed from it.

The valve 48 which interrupts the chute 46 is specially designed so as not to adversely affect the suction action of the impeller 43 in the tube 40. That is, the valve 48 is designed to prevent any appreciable flow of air up the chute 46 into the housing which would satisfy the suction action of the impeller. The valve includes a plurality of radial vanes 49 carried on the shaft 50 of the motor 51. The outer edges of the vanes 49 have a very close tolerance with the inner surface of the cylindrical case 52 of the valve 48 and the side edges 53 of the vanes bare against the end walls 54 of the case. The motor 51 drives the vanes very slowly to prevent any appreciable quantity of air from being fed into the upper portion of the chute 46. As the coins drop through the cylinder 45 and the chute 46, they are directed into the V-shaped troughs formed between adjacent pairs of radial blades 49. As these troughs turn with the rotation of the shaft 50, they are ultimately placed in alignment with the bottom portion of the chute 46, and he coins are permitted to fall into that portion and be directed into the next subassembly of the coin handling machine.

In FIGURE 5 I have illustrated an anti-pilferage safety device disposed immediately adjacent the pick-up head 41 in FIGURES 3 and 4. It will be noted in FIGURE 5 that the device is inverted with respect to the showing in the other figures. This has been done to illustrate the action of its various components.

The safety device is embodied in a cylindrical housing 56. Several fingers 57 are pivoted on the support 62 adjacent the inner surface 58 of the cylindrical wall 59 of the housing and have weighted heads 60 which control the position of the inwardly extending blades 61. As stated above, the anti-pilferage device is shown in FIGURE 5 in its inverted form. The device is designed to prevent coins which have passed into the flexible hose 40 from being shaken out of the hose through the head 41 by inverting the inlet end of the hose. The blades 61 carry overlapping webs which together fill the cross section of the housing 56 when it is inverted. These webs have been omitted from the drawing for purposes of clarity and it is to be understood that they in fact do exist and form a solid disc across the diameter of the housing. When the device is inverted, the weights 60 at the ends of each of the fingers seek the low position as illustrated in FIGURE 5 and the blades 61 rise up in the cylinder to the horizontal plane. However, when the device is in an upright position as illustrated in FIGURES 3 and 4, the weights under the influence of gravity will swing inwardly toward the center of the housing 56 seeking a low position and cause the fingers 57 to pivot about their support 62. Thus, the blades 61 and their webs (not shown) will fall against the side of the cylindrical wall 59 out of the way and not impede the flow of the coins. The weights 60 which are much shorter than the blades will not fill the cross section of the housing and retard their flow. From this description, the reader will appreciate that once coins have entered the tube 40, it is impossible for an operator to remove the coins from the tube without actually removing the head 41 and the housing 56.

In the foregoing description I have described in detail the subassembly for conveying coins from a meter into a trailer 3.

The following description of the coin handling assembly will be presented in terms of the use of the vehicle shown in FIGURE 2 particularly adapted to collect coins from parking meters. The vehicle which may be operated most efficiently by two men, that is, a driver and an equipment operator, will be parked adjacent each meter from which coins are to be extracted. When the vehicle has parked, the operator will connect the head 41 on the free end of the flexible hose 40 to the parking meter. When the head 41 is connected to the meter in the manner suggested in FIGURE 4, the coins in the meter will be conveyed by the air drawn through the hose by the impeller 43 and

flow to the sorter **30** disposed in the van **3** of the vehicle. The hose **40** of course should be long enough to allow the vehicle to park in a double line when necessary and still be capable of reaching the meter at the curb.

The pennies, nickels and dimes extracted from the parking meter are fed to the sorter **30**, and the sorter in turn will direct the coins to the respective provers **31**. The coins in the provers are in turn either sent to the reject bin by the chutes **186** or to the appropriate bin for authentic coins. When the vehicle **4** returns to the depot, the bins **32** may be emptied by some means provided for this purpose.

From the foregoing description those skilled in the art will appreciate that numerous modifications may be made of the coin conveyor shown and described without departing from the spirit of my invention. Therefore, I do not intend to limit the breadth of my invention to the specific embodiment illustrated and described, but rather, it is my intention that the scope of my invention be determined by the appended claims and their equivalents.

What I claim as new and desire to secure by Letters patent of the United States is:

1. A coin conveyor comprising a pipe having a flexible section enabling one end thereof to be moved with respect to the other end, a head connected to said one end of the pipe for receiving coins to be conveyed, a plurality of perforations formed in the pipe in a nonflexible section thereof and of a diameter smaller than the diameter of coins to be conveyed, a housing surrounding the perforated portion of the pipe, a suction pump disposed in the housing for drawing air from the pipe through the housing, and a valve disposed in the pipe adjacent said other end beyond the housing and retarding the flow of air from that end into the housing.

2. A device as defined in claim **1** further characterized by a one-way valve disposed in said pipe immediately adjacent the head which automatically closes when the head is disposed in one position and automatically opens when the head is disposed in a second position for preventing coins in the pipe from being drawn out through the head.

3. A device as defined in claim **1** wherein the valve comprises a cylindrical case closed at each end by flat end walls, a shaft extending through one of the walls into the case and coaxial with the case, a plurality of radial blades carried by the shaft and with their sides engaging the flat end walls of the case and their ends engaging the cylindrical wall, adjacent blades forming troughs between them adapted to receive coins, said pipe being interrupted by the case and with the pipe connections to the case being in communication with different troughs.

4. A device as defined in claim **3** further characterized by a one-way valve disposed in the pipe immediately adjacent the head which automatically closes when the head is disposed in one position and automatically opens when the head is disposed in a second position preventing coins in the pipe from being drawn out through the head.

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