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(54) **Monochannel device for control, storage and collection of coins**

Einkanalige Vorrichtung zum Prüfen, Speichern und Sammeln von Münzen

Dispositif à canal unique pour la sélection, le stockage et la collection de pièces de monnaie

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Description

The invention refers to a device for the control, storage and collection of coins, employing a monochannel through which the coins travel from the point where they are inserted to the point where they are collected or returned.

The device is generally applicable to all types of coin-operated machines, and especially to paystation telephones which clearly require the insertion of coins of any type and/or value for their operation.

Background to the invention

The application EP-A-0 266 090 discloses a coin handling system having the coin validator for checking the authenticity and value of the coins. The accepted coins are directed to a coin store which is formed as a downwardly inclined chute in order to permit the coins to roll down.

Positioned along the top of coin store there is a series of levers pivotally mounted on a common longitudinal pivot member. These levers have a first portion that extends through slots to retain corresponding coins and an inwardly extending portion.

When a first coin is inserted into the device, it is validated by the validator. If it is valid, the coin passes through and accept/reject gate into the coin store which engages a first lever causing to move aside, there being no stop in the path of the coin at this stage. The coin will continue to roll down and the lever return to its rest position.

The same will occur with a second lever and so on until last lever, where the coin will stop resting on a end wall, supported by the top surface of a member of an exit gate and keeping moved aside the last lever preventing this from returning to its rest position. In this way, the first portion of this lever remains extended through a slot, forming a wall to stop a second coin rolling down after the first one and therefore, preventing contact between any subsequent coin and the first one.

When the coins have to be refunded, the exit gate turns, permitting the first coin to drop vertically to the refund box. The last lever is then released permitting the second coin to roll down until the exit gate, moving aside this last lever and then dropping to the refund box. The third coin operates in a similar way for the two last levers and so on.

When the monochannel is full of coins the process for refunding these coins produces a continuous movement of the mechanical levers that shorts the working life of said levers.

Characterisation of the invention

The device of the invention is based on a structure in which a monochannel exists that is accessible to all coins accepted by the respective coin selector, the said

channel having a slight downward slope from the point of entrance to the point of exit to permit the coins to roll down a slipway, and where in one of the sides of the monochannel device has a number of slots through which emerge respective retractable levers that in their outermost position retain corresponding coins as they proceed down the slipway.

The slipway is mounted in an articulated manner to a shaft around which it can turn in order to constitute actual coin slipway, or to tilt and retract permitting all the coins to fall directly into a coin return channel.

The device besides comprises a ending coin sensor at the entrance of the collection box for detecting the passage of collected coins.

By means of this device, based on the concepts stated above, it is possible to have perfect control over any number of coins inserted in any order, providing the control circuit with complete information on the different coins present at any given moment so that this circuit can decide on possible options depending on how the call is progressing. All this control process is carried out without motors and with no need for sources of power other than from the telephone line itself.

The refunding process of the accepted coins being in the monochannel device is very fast and there is no extraworking of the mechanical levers avoiding early failures of said levers.

On the other hand, since the coins are held in modules individually, there will be no jams produced through the indiscriminate insertion of coins.

Summarising, the device is reliable, efficient, simple and cheap, as well as occupying little space, making it possible to have compact paystation telephone.

To complement the description that is given below and in order to better understand the characteristics of the invention, a set of drawings is provided which make it easier to comprehend the characteristics and advantages of the invention.

Figure 1 shows a side elevation of a cross-section of the device of the invention, including the wall of the monochannel device through which the coin-retaining levers can be retracted, including also the slipway and, in dashed lines, the coils that act the retractable levers.

Figure 2 shows a cross-sectional view of the device in which can be seen one of the retractable levers for the retention of the respective coin, as well as the coil associated with this lever and the corresponding sensor for detecting the presence of a coin.

DESCRIPTION OF AN IMPLEMENTATION OF THE INVENTION

In the light of the figures, and specifically figure 1, the device can be seen in an application for a general instrument 1, which could be a paystation telephone instrument with coin entrance 2 that will include, logically, its corresponding coin selector, such that the coins rejected have access to a coin return channel 3, while

those admitted as valid are gravity-fed to a monochannel module 4 where control, storage and collection of the coins take place. The monochannel module 4 has a slight slope so that the coins 5, 5', 5'', ... can slide towards the exit of the monochannel module, which corresponds to the entrance 6 of the collection box.

In the implementation being described, it can be seen that the monochannel module 4 can store three coins, in such a way that the coin 5 is situated in the lowest part of the monochannel module or "collection zone", while the coins 5' and 5'' are located above it in the two "waiting zones". Depending on the necessary storage capacity and on the size of the instrument in which it is held, the device could have more waiting zones.

The coins 5, 5', 5'' move along a slipway 7 located between two walls that define the monochannel module 4. The slipway 7 is formed from an L-shaped profile that can tilt between two positions, one being the working position and the other for coin-return; such that in the first case, which corresponds to that shown in the figures 1 and 2, the coins 5, 5', 5'' rest on the horizontal branch of the profile that forms the slipway 7, while in the coin-return position the slipway 7 tilts in order to allow all the coins to fall into the coin-return channel 3, which occurs when the telephone call being made by the user is over and he wishes to recuperate the coins still held in the monochannel module 4 and which have not been collected. The tilting action mentioned is produced by a retractable lever 8, logically linked to the slipway 7 and which is activated by the user when he wishes to recover the coins which have still not been collected.

Projecting perpendicularly from one of the walls of the monochannel module 4 are a series of retractable levers 9, 9' and 9'', equidistant from one another. These levers remain perpendicular to this wall in their "out" position as is shown in figure 2. Each one serves to retain one coin and each retractable lever 9, 9', 9'' is associated with a coil 10, 10', 10'' which, when energised, causes the lever 9, 9', 9'' to switch position and allow the respective coin 5, 5', 5'' to pass. Each coil 10, 10', 10'' has an associated restoring spring 11, 11', 11''.

The assembly is completed with an equal number of sensors 12, 12', 12'', all of which are connected to an control circuit 13. These sensors 12, 12', 12'' are used to detect the presence of the coins 5, 5', 5'', in order to transmit the corresponding control signals to the control circuit 13.

When the paystation telephone instrument is in an idle state, the coins that are inserted through the entrance 2 are accepted, reach the monochannel module 4 and start to roll along the slipway 7 resting against and directed by the inner wall of the two that form the monochannel module 4.

When the paystation telephone instrument is in the idle state, the coils 10, 10', 10'' are unenergised and, consequently, the retractable levers 9, 9', 9'' project into the monochannel module 4.

When the user inserts the first coin 5 this, once validated and accepted, starts to roll along the slipway 7, arriving at the position of the retractable lever 9'' where it is stopped. The sensor 12'' detects the presence of the coin and transmits the corresponding signal to the control circuit. At the same time the coin-detecting sensors 12' and 12 are informing the control circuit that there are no coins being retained by the retractable levers 9' and 9.

With this information, the control circuit instructs the coil 10'' to be energised; this causes the retractable lever 9'' to be withdrawn and the coin 5, unimpeded, rolls into the position corresponding to retractable lever 9', where it is stopped. Next, coil 10'' is deenergised and the lever 9'' returns to its idle position, projecting into the monochannel module 4, because of the action of the restoring spring 11''.

The presence of the coin 5 retained by the retractable lever 9' is detected by the coin-detecting sensor 12', which informs the control circuit. At the same time, the sensor 12 is informing the control circuit that there is no coin being retained by the retractable lever 9.

With this information, the control circuit instructs coil 10' to be activated, producing the withdrawal of the retractable lever 9' and coin 5, unimpeded, rolls towards the position of retractable lever 9, where it is stopped. Next, coil 10' is deenergised and the retractable lever 9' returns to its idle position, projecting into the monochannel module 4, because of the action of the restoring spring 11'.

At this stage of the process, the coin 5 is stored in the lowest part of the monochannel module 4, that is, in the collection zone.

If the user inserts a second coin 5' and it is validated and accepted, it starts to roll along the slipway 7, arriving at the position of the retractable lever 9'' where it is stopped. The sensor 12'' detects the presence of the coin and transmits the corresponding signal to the control circuit. At the same time the coin-detecting sensor 12' is informing the control circuit that there are no coins being retained by the retractable lever 9'.

With this information, the control circuit instructs the coil 10'' to be energised; this causes the retractable lever 9'' to be withdrawn and the coin 5', unimpeded, rolls into the position corresponding to retractable lever 9', where it is stopped. Next, coil 10'' is deenergised and the lever 9'' returns to its idle position, projecting into the monochannel module 4, because of the action of the restoring spring 11''.

At this stage of the process, the coin 5 is stored in the collection zone and coin 5' is stored in the first waiting zone.

If, under these circumstances, the user inserts a third coin 5'', this, once validated and accepted, would reach the position corresponding to the retractable lever 9'', where it would be held up.

All that has been described above would be repeated as many times as there are waiting zones in the in-

strument, in each case transmitting unmistakable information on each coin to the control circuit, making available at all times an exact map with the location of each coin, such that, with this information, together with that provided by the validating element on the type of coins introduced, the control circuit has all the necessary information in order to progress the call in course.

Once the coins 5, 5' and 5", or all the coins that the device can admit have been stored, the manner in which collection is done is as follows: with the first coin 5 in the static position as is shown in figure 1, if the control circuit decides to collect it, coil 10 is activated; this produces the withdrawal of the retractable lever 9, which tilts backwards on its shaft 14, permitting the coin 5 to move unimpeded to the entrance 6 of the collection box. The coil 10 is then deenergised and, because of the restoring spring 11, the lever 9 in the collection zone returns to its idle position and closes once again the slipway.

The control circuit is sure that the first coin has been collected in two ways. First, the sensor 12 detects and communicates the situation of no coin being present, which verifies that it has been this coin that has moved. Second, it receives a pulse from the sensor 15, that detects the passage of a coin for collection, arranged at the exit, which ensures that the coin has moved into the collection box.

To complete the collection process, if the control circuit is receiving information from sensor 12' that there is a coin waiting, it activates the coil 10', causing the retractable lever 9' in the first waiting zone to withdraw, tilting backwards in the same way as the lever 9 had done before, leaving the slipway free; at this moment the second coin 5' is no longer retained and rolls forward to the next point of detention represented by retractable lever 9 pertaining to the collection zone.

This occurrence is recognised by the control circuit, since sensor 12' no longer detects the presence of the coin 5', which means that it has moved; sensor 12 then signals the presence of a new coin, which indicates that the movement in question has been into the collection position.

Had there been more waiting zones in the device, and had these had coins in them, the device would repeat all that has been described before, the final result being the displacement of all the coins into the collection position.

If it is desired to recover the coins not used, that is, those retained in the monochannel device 4, it is sufficient to act on the slipway 7 causing it to withdraw slightly and permitting all the coins 5, 5' and 5" to fall by gravity into the coin return channel 3. The tilting action of the said slipway 7 takes place around the axis 16 which is clearly shown in the figure 2.

Under such circumstances, the control circuit is aware of what has happened because the sensors 12, 12' and 12" communicate that there are no coins presently retained by the retractable levers 9, 9' and 9".

Claims

1. Monochannel device for control, storage and collection of coins accepted by a coin selector, having a slight downward slope to permit the coins (5, 5', 5", ...) to roll down a slipway (7) and wherein one of the sides of the monochannel device (4) has a number of slots through which emerge respective retractable levers (9, 9', 9", ...) that in their outermost position retain corresponding coins (5, 5', 5", ...) as they proceed down the slipway (7) and **characterised** in that the slipway (7) is mounted in an articulated manner to a shaft (16) around which it can turn in order to constitute actual coin slipway (7), or to tilt and retract permitting all the coins to fall directly into a coin return channel (3).
2. Monochannel device according to claim 1 characterised in that the coins (5, 5', 5", ...) are detected by corresponding coin sensors (12, 12', 12", ...) of magnetic type.
3. Monochannel device according to claim 1 characterised in that each retractable lever (9, 9', 9", ...) switches its position tilting around a respective shaft (14, 14', 14", ...) when an associated coil (10, 10', 10", ...) is energised and has an associated restoring spring (11, 11', 11", ...) to reinsert the corresponding retractable lever (9, 9', 9", ...) into the monochannel device (4) when the energising of the corresponding coil (10, 10', 10", ...) has concluded.
4. Monochannel device according to claim 1 characterised in that it also comprises an ending coin sensor (15) for detecting the passage of collected coins.

Patentansprüche

1. Einkanalvorrichtung zur Steuerung, zum Speichern und Annehmen von Münzen, die von einem Münzwähler angenommen wurden, die eine leichte Neigung nach unten hat, damit die Münzen (5, 5', 5", ...) eine Rutsche (7) abwärts rollen können und in der eine der Seiten der Einkanal-Vorrichtung (4) eine Anzahl von Schlitzfenstern hat, durch die entsprechende einziehbare Hebel (9, 9', 9", ...) herausragen, die in ihrer äußersten Position entsprechende Münzen (5, 5', 5", ...) zurückhalten, wenn sie die Rutsche (7) abwärts laufen, und die dadurch gekennzeichnet ist, daß die Rutsche (7) gelenkig auf einer Welle (16) montiert ist, um die sie sich drehen kann, um in der Tat Münzrutsche (7) zu werden oder um zu kippen und zurückzufahren, damit alle Münzen direkt in einen Münzrückgabekanal (3) fallen können.

2. Einkanalvorrichtung gemäß Anspruch 1, dadurch gekennzeichnet, daß die Münzen (5, 5', 5'', ...) durch entsprechende Münzsensoren (12, 12', 12'', ...) magnetischer Art erkannt werden.
3. Einkanalvorrichtung gemäß Anspruch 1, dadurch gekennzeichnet, daß jeder einziehbare Hebel (9, 9', 9'', ...) seine Position umschaltet, indem er um eine entsprechende Welle (14, 14', 14'', ...) kippt, wenn eine zugehörige Spule (10, 10', 10'', ...) mit Strom versorgt wird, und eine zugehörige Rückstellfeder (11, 11', 11'', ...) hat, um den entsprechenden einziehbaren Hebel (9, 9', 9'', ...) in die Einkanalvorrichtung (4) wieder einzuführen, wenn die Stromversorgung der entsprechenden Spule (10, 10', 10'', ...) beendet ist.
4. Einkanalvorrichtung gemäß Anspruch 1, dadurch gekennzeichnet, daß sie auch einen Münzensensor (15) umfaßt, der den Durchgang der angenommenen Münzen erkennt.
- lorsque l'activation de l'enroulement correspondant (10, 10', 10'', ...) est terminée.
4. Dispositif à canal unique selon la revendication 1, caractérisé en ce qu'il comprend également un capteur de pièces de monnaie final (15) pour détecter le passage de pièces de monnaie collectées.

Revendications

1. Dispositif à canal unique pour contrôler, stocker et collecter des pièces acceptées par un sélecteur de pièces de monnaie, présentant une légère pente vers le bas pour permettre aux pièces de monnaie (5, 5', 5'', ...) de rouler dans une glissière (7) et dans lequel l'un des côtés du dispositif à canal unique (4) comporte plusieurs fentes par lesquelles sortent des leviers rétractables respectifs (9, 9', 9'', ...) qui, dans leur position extrême, retiennent des pièces de monnaie correspondantes (5, 5', 5'', ...) lors de leur descente dans la glissière (7), et caractérisé en ce que la glissière (7) est montée de manière articulée sur un axe (16) autour duquel elle peut tourner de manière à constituer une glissière de pièces de monnaie réelle (7), ou à basculer et à se rétracter, permettant à toutes les pièces de monnaie de tomber directement dans un canal de retour de pièces de monnaie (3).
2. Dispositif à canal unique selon la revendication 1, caractérisé en ce que les pièces de monnaie (5, 5', 5'', ...) sont détectées par des capteurs de pièces de monnaie correspondants (12, 12', 12'', ...) de type magnétique.
3. Dispositif à canal unique selon la revendication 1, caractérisé en ce que chaque levier rétractable (9, 9', 9'', ...) change de position en basculant autour d'un axe respectif (14, 14', 14'', ...) lorsqu'un enroulement associé (10, 10', 10'', ...) est activé et comporte un ressort de rappel associé (11, 11', 11'', ...) pour réintroduire le levier rétractable correspondant (9, 9', 9'', ...) dans le dispositif à canal unique (4).

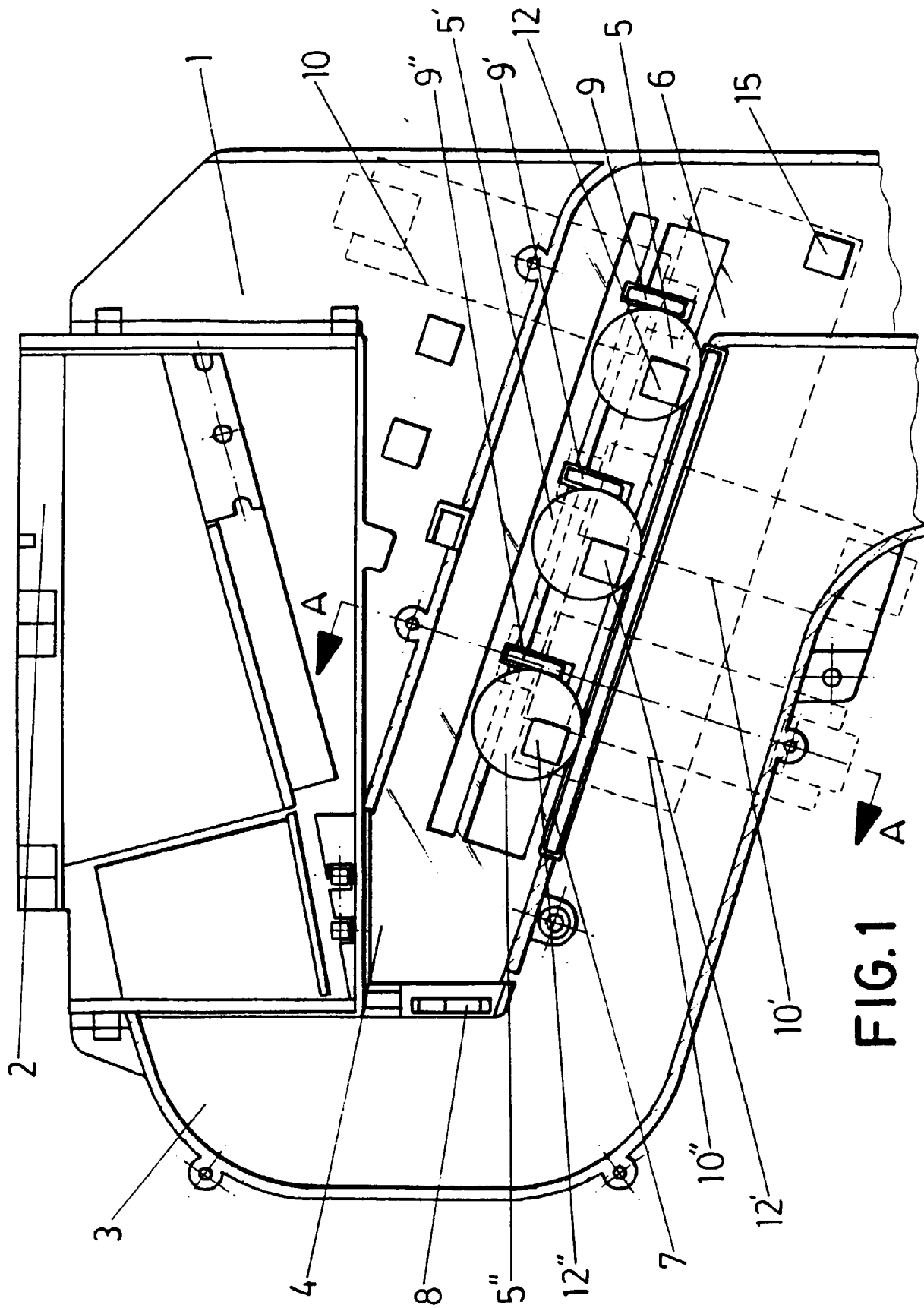


FIG. 1

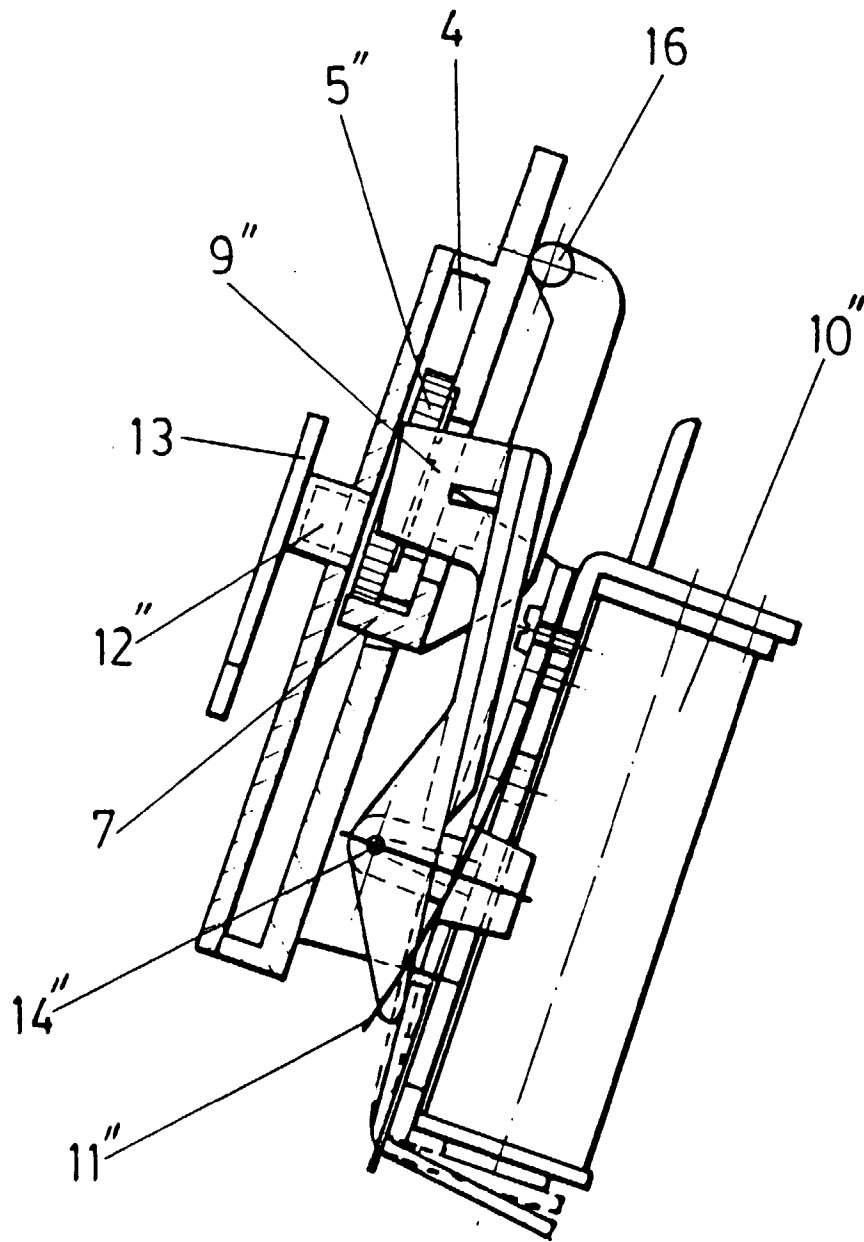


FIG. 2
A-A