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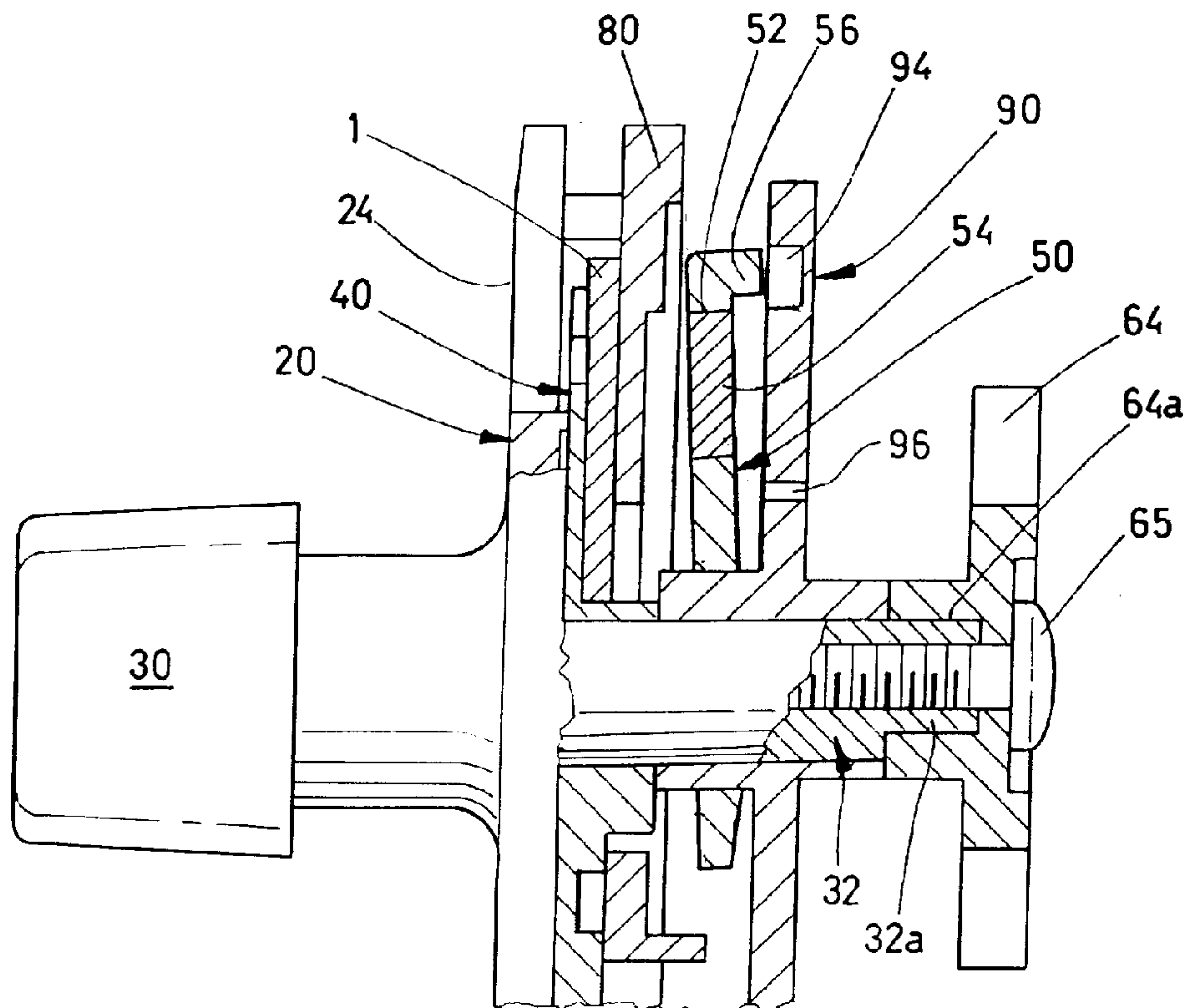
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(54) Titre : MECANISME A MONNAIE A SYSTEME DE DEVERROUILLAGE MAGNETIQUE

(54) Title: COIN MECHANISM WITH MAGNETIC RELEASE SYSTEM



(57) Abrégé/Abstract:

A coin mechanism is provided with a magnetic release system, for selectively unlocking the coin mechanism when a coin or token having a magnetic component is inserted. A magnet is lodged in a rocker arm which is biased to a locked position in which a latch on the rocker arm engages a rotating member, preventing the rotating member from rotating. The attractive force of the magnet on a coin or token having a magnetic component and inserted into the coin mechanism is greater than the force biasing the rocker arm to the locked position, causing the rocker arm to move toward the coin which thus retracts the latch from the rotating member allowing the rotating member, and thus the mechanism, to rotate.



Abstract

A coin mechanism is provided with a magnetic release system, for selectively unlocking the coin mechanism when a coin or token having a magnetic component is inserted. A magnet is lodged in a rocker arm which is biased to a locked position in which a latch on the rocker arm engages a rotating member, preventing the rotating member from rotating. The attractive force of the magnet on a coin or token having a magnetic component and inserted into the coin mechanism is greater than the force biasing the rocker arm to the locked position, causing the rocker arm to move toward the coin which thus retracts the latch from the rotating member allowing the rotating member, and thus the mechanism, to rotate.

Field of Invention

This invention relates to coin mechanisms for vending machines. In particular, this invention relates to a coin mechanism for a bulk vendor or other apparatus, having a magnetic coin release system that prevents the mechanism from turning unless a coin deposited into the mechanism comprises a magnetic component.

Background of the Invention

Rotary coin mechanisms are widely used in merchandise-dispensing machines such as bulk vendors for dispensing gumballs and other small articles. Bulk vendors are designed for self service by users with minimal maintenance, and as such are frequently placed in locations where their use cannot be readily supervised. As a result bulk vendors are constantly subjected to attempts to steal merchandise, usually by children and adolescents.

One common type of theft from bulk vendors involves the use of "slugs" approximating the size of the coins which the coin mechanism is designed to accept. This has led to the development of measuring devices with fairly precise tolerances, capable of determining the thickness and diameter of the inserted coin to within a few thousandths of an inch. However, while in the past slugs were commonly cut or stamped out of sheet metal, more recently slugs composed of plastic or sturdy cardboard have become popular due to their low cost and the ease with which such slugs can be produced to the required size. Cardboard slugs present a particular problem in bulk vendors, because repeated attempts to force the mechanism to turn with an oversized cardboard slug in the coin recess can result in gradual wearing away of the edge of the slug, and once the edge has worn to a size within the tolerance of the measuring dog the mechanism will accept the slug.

A further problem is raised by the use of coins belonging to currency from other countries which may have a lower relative value than a coin of the intended denomination, but which coincidentally approximate the size and shape of the intended coin. In some cases such coins can be used in place of the intended

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coin, which similarly results in losses to bulk vendor operators.

The present invention overcomes these problems by providing a coin mechanism for a bulk vendor which provides a magnetic release system that can be actuated only by a coin having a magnetic component. Plastic and cardboard slugs, metal slugs containing no magnetic component and non-magnetic coins from the same or other currencies cannot be used to operate the coin mechanism of the invention. This is accomplished without interfering with existing coin measuring devices, and as such provides an additional method of discriminating between coins of the proper denomination and other coins or slugs.

The invention accomplishes this by providing a rocker arm comprising a magnet, which is biased toward and locks into a rotating member that rotates with the coin mechanism. In the biased position a latch on the rocker arm impinges into the rotational path of a recess or opening in the rotating member, to prevent the rotating member from rotating and thus prevent the coin mechanism from rotating and dispensing merchandise. When a coin having a magnetic component is deposited into the coin recess, the magnet exerts sufficient attractive force on the coin to move the rocker arm toward the coin and away from the rotating member, thus unlocking the rotating member and allowing the mechanism to rotate through its dispensing cycle.

The present invention thus provides a coin mechanism comprising a stationary cover plate having a coin opening, a handle fixed to a shaft extending through the cover plate, a coin conveyor comprising a coin receiving portion, rotationally engaged to the shaft such that the coin receiving portion is in substantial alignment with the coin opening when the coin conveyor is in a rest position, a rotating member rotationally engaged to the shaft and spaced from the coin conveyor, such that the rotating member rotates with the coin conveyor along a rotational path, a movable arm comprising a latch and a magnet, mounted between the coin conveyor and the rotating member in rotationally fixed relation to the cover plate, the arm being movable between a locked position in which the latch

impinges into the rotational path of the rotating member to substantially prevent rotation of the rotating member, and an unlocked position in which the latch is retracted from the rotational path of the rotating member to permit rotation of the rotating member, the arm being biased to the locked position by a biasing force when the coin conveyor is in the rest position, whereby when a coin or token having a magnetic component is deposited into the coin receiving portion, an attractive force of the magnet on the coin or token is sufficient to overcome the biasing force and move the arm to the unlocked position permitting rotation of the rotating member, such that rotation of the handle rotates the coin conveyor to convey the coin or token from the rest position to a coin ejection position.

The present invention further provides an apparatus for dispensing merchandise having a coin mechanism comprising a stationary cover plate having a coin opening, a handle fixed to a shaft extending through the cover plate, a dispensing gear mounted on the shaft, a coin conveyor comprising a coin receiving portion, rotationally engaged to the shaft such that the coin receiving portion is in substantial alignment with the coin opening when the coin conveyor is in a rest position, a rotating member rotationally engaged to the shaft and spaced from the coin conveyor, such that the rotating member rotates with the coin conveyor along a rotational path, a movable arm comprising a latch and a magnet, mounted between the coin conveyor and the rotating member in rotationally fixed relation to the cover plate, the arm being movable between a locked position in which the latch impinges into the rotational path of the rotating member to substantially prevent rotation of the coin conveyor, and an unlocked position in which the latch is retracted from the rotational path of the rotating member to permit rotation of the coin conveyor, the arm being biased to the locked position by a biasing force when the coin conveyor is in the rest position, whereby when a coin or token having a magnetic component is deposited into the coin receiving portion, an attractive force of the magnet on the coin or token is sufficient to overcome the biasing force and move the arm to the unlocked position permitting rotation of the rotating member, such that rotation of the handle rotates the coin conveyor to convey the coin or token from the rest position to a coin ejection position and rotates the dispensing

gear to dispense merchandise from the merchandise-dispensing apparatus.

Brief Description of the Drawings

In drawings which illustrate by way of example only a preferred embodiment of the invention,

Figure 1 is a perspective view of a bulk vendor embodying the coin mechanism of the invention,

Figure 2 is a front perspective view of a coin mechanism of the invention,

Figure 3 is a rear perspective view of the coin mechanism of Figure 2,

Figure 4 is an exploded perspective view of the coin mechanism of Figure 2,

Figure 5 is a side elevation of the coin mechanism of Figure 2 partly in cross-section, showing the rocker arm in a locked position,

Figure 6 is a side elevation of the coin mechanism of Figure 2 partly in cross-section, showing the rocker arm in an unlocked position,

Figure 7 is a partially cutaway front elevation of a preferred embodiment of the rotating member,

Figure 8 is a side elevation of the coin conveyor and rotating member showing a preferred manner of mounting the rocker arm,

Figure 9 is an exploded perspective view of a further embodiment of the coin mechanism of the invention, and

Figure 10 is a rear elevation of the rotating member and rocker arm in the coin mechanism of Figure 9.

Detailed Description of the Invention

Figure 1 illustrates a merchandise-dispensing apparatus commonly known as a bulk vendor 2 in which the coin mechanism 10 of the invention may be employed. The vendor 2 conventionally includes a lower housing 4 enclosing the workings of the coin mechanism and a cash box (not shown) for collecting deposited coins or tokens 1, a transparent article storage bin 5 for storing merchandise such as gumballs or other articles to be dispensed, and a turntable 6 which is rotated by

rotation of the coin mechanism 10 to align one of a plurality of product carriers with the opening to a dispensing chute 8, as is well known.

It will be understood that although the invention will be described with reference to a coin, the term "coin" as used herein includes coins and tokens and like elements and is in no way restricted to currency or coins having a monetary value. It will also be understood that the coin mechanism of the invention may be used in other types of apparatus which do not necessarily dispense merchandise, for example parking meters, and the invention is not restricted to any particular application of the coin mechanism 10.

Figures 2 to 8 illustrate a preferred embodiment of the coin mechanism 10 of the invention. The mechanism 10 comprises a cover plate 20 having a coin opening 24, a circular recess 22 in its rear face (seen in Figure 4) in which a substantially disc-shaped coin conveyor 40 rotates, and an opening 26 centred in the recess 22. The handle 30 is fixed to a tapered shaft 32 which extends through the opening 26 and engages an opening 38 disposed through the centre of the coin conveyor 40. The shaft 32 has a longitudinal flat (or slightly concave) surface 32a to rotationally engage the various components engaged to the shaft 32.

The coin conveyor 40 includes a coin receiving portion for receiving a coin 1, which in the preferred embodiment comprises a suitably dimensioned recess 42 in which the coin 1 nests as it is conveyed about the rotational cycle of the coin mechanism 10. The coin receiving portion may additionally (or alternatively) comprise a pair of spaced apart pins 42a, a ledge (not shown) or any other means capable of supporting a coin 1.

In the illustrated embodiment the coin conveyor 40 is provided with peripheral ratchet teeth 41 which cooperate with a pawl 66 biased against the teeth 41 by springs 66a, to prevent reverse rotation of the mechanism 10 during most of the rotational cycle. Alternatively a separate gear could be used for this purpose.

A back plate 80 overlays the coin conveyor 40 and is affixed to the cover plate 20 so as to be stationary relative thereto, as by bolts 81. The back plate 80 retains a coin 1 in the coin recess 42 along the rotational path followed by the coin 1 as the mechanism 10 is rotated. The shaft 32 extends through the opening 86 in the back plate 80 and terminates at a squared end 32a which engages into a square recess 64a formed in a dispensing gear 64 (see Figure 5) for rotating the turntable 6. Thus, the cover plate 20 and back plate 80 remain stationary, while the coin conveyor 40 and gear 64 are fixed in position on the shaft 32 and rotate as the handle 30 is turned.

A dog 70 for measuring the thickness of a coin 1 is mounted on the back plate 80 biased against the coin recess 42 by a spring 70a, and catches the trailing edge of the coin recess 42 if an inserted coin or slug is thinner than the intended coin 1, to arrest rotation of the mechanism 10. Another dog 34 for measuring the diameter of the coin 1 is mounted on the cover plate 20 biased against the coin conveyor 40 by a spring 34a, and catches a detent (not shown) formed in the front face of the coin conveyor 40 if an inserted coin or slug does not have the correct diameter, to arrest rotation of the mechanism 10.

The coin mechanism 10 described thus far is well known to those skilled in the art. The present invention provides a system for preventing rotation of the mechanism 10 unless a coin 1 having a magnetic component is deposited into the coin recess 42. As defined herein a coin has a magnetic component if it contains a sufficient quantity of a magnetic substance, such as iron, as to enable a magnet 54 to exert an attractive force on the coin.

The invention comprises a movable arm, in the preferred embodiment a rocker arm 50, provided with a magnetized element such as a disc magnet 54 which is seated in a hole 52 in the the rocker arm 50, preferably so as to be flush with the front and rear faces of the rocker arm 50. The magnet 54 may be a permanent magnet or an electromagnet. The magnet 54 may be affixed in place by clinching around the periphery of the hole 52, or alternatively by epoxy or any other suitable adhesive or other means.

The rocker arm 50 is preferably mounted about the shaft 32, but is rotationally fixed relative to the cover plate 20 so that the rocker arm 50 does not rotate with the shaft 32. In the preferred embodiment this is preferably ensured by providing a pair of bosses or pins 53 extending from the back plate 80 which abut the side edges of the rocker arm 50 to prevent any rotation, ie. to maintain the rocker arm 50 oriented in a rotationally fixed position relative to the back plate 80 (and thus to the cover plate 20).

The rocker arm 50 includes an opening 51 which mounts about the shaft 32 to resist lateral and vertical displacement of the rocker arm 50, but is sufficiently larger than the shaft 32 so as not to interfere with rotation of the shaft 32. This allows the rocker arm 50 to move between the back plate 80 and a rotating member 90 engaged to the shaft 32. In the preferred embodiment the rotating member 90 comprises a disc 92, engaged to the shaft 32 so as to rotate with the shaft 32 and consequently with the coin conveyor 40. The disc 92 is provided with an opening or recess 94, best seen in Figure 7, into which a latch 56 protruding from the rocker arm 50 engages when the disc 92 is in the rest position.

The rocker arm 50 is mounted between the coin conveyor 40 and the disc 92. In the preferred embodiment the back plate 80 is interposed between the coin conveyor 40 and the rocker arm 50, providing a stationary surface from which the bosses or pins 53 project to retain the rocker arm 50 against rotation. In this embodiment the back plate 80 must be formed from a non-magnetic material, such as aluminum, so that it does not interfere with the magnetic attraction of the magnet 54 on a coin 1 having a magnetic component.

The rocker arm 50 is biased toward the rotating member 90, in the preferred embodiment by a magnetic mass 96 such as a steel pin or the like lodged in the disc 92 near the radial position of the magnet 54. A coin 1 having a magnetic component, when inserted into the coin recess 42, will overcome the attractive force of the magnet 54 on the magnetic mass 96 and cause the rocker arm 50 to move toward the coin recess 42. In order to ensure that the rocker arm 50 will move

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under the force of magnetic attraction exerted by the magnet 54 on a coin 1 having a magnetic component, the mass 96 is made significantly smaller than the magnetic component of the intended coin 1, and preferably the mass 96 is positioned in the rotating member 90 offset from the axis of the magnet 54, for example slightly beneath and laterally off centre as shown in Figure 7.

A biasing force for biasing the rocker arm 50 to the locked position may alternatively be supplied by a resilient element, such as a spring, rubber block or filament etc. (not shown), so long as the biasing force against the magnetic mass 96 is less than the attractive force exerted by the magnet 54 on a coin 1 having a magnetic component seated in the coin recess 42.

The rocker arm 50 is preferably provided with one or more lateral projections 57, best seen in Figure 8, forming a pivot ledge or fulcrum which spaces the rocker arm 50 from the back plate 80 and consequently provides a clearance within which the rocker arm 50 can move axially between the locked and unlocked positions. The back plate 80 is preferably provided on both sides of the opening 86 with pairs of ribs 88 between which the projections 57 are seated, as shown in Figure 8, to resist vertical displacement of the rocker arm 50.

It will be appreciated that the projections 57 nesting between the ribs 88 will also provide some degree of resistance to rotation of the rocker arm 50. As such, it may not be necessary in all cases to mount the rocker arm 50 about the shaft 32 or to provide pins or bosses 53 specifically functioning to prevent rotation of the rocker arm 50. Because both the projection 57 and the ribs 88 are preferably rounded to facilitate free axial movement of the rocker arm 50, these additional structures are recommended for durability and trouble-free operation. However, it will be apparent that the rocker arm 50 could also be hinged to the back plate 80 or in some other manner affixed in position so as to be rotationally stationary but axially movable, and the invention is not intended to be restricted to the preferred embodiment illustrated.

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In operation, the mechanism 10 is in the rest position shown in Figures 2 and 5, with the coin recess 42 in alignment with the coin opening 24 in the cover plate 20. In this position the magnet 54 is attracted to the magnetic mass 96 lodged in the disc 92, and the rocker arm 50 is thus biased to the locked position shown in Figure 5, with the latch 56 engaging the opening or recess 94 in the disc 92. Because the rocker arm 54 is rotationally fixed in relation to the back plate 80 and cover plate 20, which are stationary relative to the vendor 2, the disc 92 is prevented from rotating so long as the latch 56 remains engaged in the opening or recess 94; since the disc 92 is rotationally engaged to the shaft 32, the shaft 32 is similarly prevented from rotating and the handle 30 cannot be turned.

When a coin 1 of the intended denomination (which in the case of the coin mechanism 10 of the invention will have a magnetic component) is deposited through the coin opening 24, the coin 1 nests in the coin recess 42 of the coin conveyor 40, as shown in Figure 5. The coin 1 now being in close proximity to the magnet 54, the attractive force of the magnet 54 on the magnetic mass 96 is overcome by the attractive force of the magnet 54 on the coin 1, which has a significantly greater magnetic component. The rocker arm 50 thus pivots toward the coin conveyor 40, retracting the latch 56 from the opening or recess 94 and permitting the rotating member 90 to rotate, as shown in Figure 6. This frees the shaft 32 and allows the handle 30 to be turned to the point in the rotational cycle where the measuring dogs 34, 70 can measure the coin 1 to ensure that it is of the correct diameter and thickness. (At this point both the coin 1 and the magnetic mass 96 are too far away from the magnet 54 to be magnetically influenced thereby, so the rocker arm 50 is not biased to either the locked or unlocked positions and rocks freely.) If the coin 1 is of the intended denomination, the measuring dogs 34, 70 will allow the mechanism 10 to be rotated through the dispensing cycle.

As the handle 30 is turned the gear 64 rotates the turntable 6 so that an opening in the turntable 6 comes into alignment with the dispensing chute 8 and dispenses merchandise to the user. The coin 1 is typically released from the mechanism 10 just beyond the halfway point in the rotational cycle of the

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mechanism 10, so that as the disc 92 returns to the rest position only the magnetic mass 96 is present to influence the magnet 54 and the rocker arm 50 is thus drawn back to the locked position as the recess 94 comes into alignment with the latch 56.

It may be preferable to form the recess 94 in the disc 92 so that it is longer than the width of the latch 52. This will allow some 'free play' in the handle 30, which can be beneficial for maintaining a uniform distribution of merchandise in the article storage bin 5 of the vendor 2. The rest position is the only point in the rotational cycle at which the mechanism 10 can be turned in reverse (counter-clockwise in the embodiment shown), and even a slight reverse rotation helps to scatter merchandise about the article storage bin 5 enough to prevent local accumulation.

It will be appreciated that the principle of the invention resides in the use of a rocker arm 50 which is rotationally fixed in relation to the cover plate 20 and in the locked position impinges into the rotational path of the rotating member 90 which is rotationally engaged to the shaft 32, so as to prevent the rotating member 90, and thus the shaft 32 and all of the other components engaged thereto, from rotating unless a coin 1 with a magnetic component is deposited into the coin receiving portion 42. In the preferred embodiment the rotating member 90 is provided as a disc 92, which helps to avoid potential problems such as structural weakness and misalignment between the latch 52 and the rotating member 90. However, it should be appreciated that the rotating member 90 could be any structure which rotates in fixed relation to the shaft 32, such as a finger 98 as shown in Figures 9 and 10.

It can thus be seen that the coin mechanism 10 of the invention will not operate in response to coins and slugs having no magnetic component. This considerably narrows down the range of metal coins and slugs which will be accepted by the coin mechanism 10, and eliminates the possibility of acceptance of cardboard and plastic slugs.

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The invention having been thus described with reference to a preferred embodiment, it will be apparent to those skilled in the art that variations and modifications of the invention may be made without departing from the scope of the invention, as set out in the appended claims.

I CLAIM:

1. A coin mechanism comprising
a stationary cover plate having a coin opening,
a handle fixed to a shaft extending through the cover plate,
a coin conveyor comprising a coin receiving portion, rotationally
engaged to the shaft such that the coin receiving portion is in substantial alignment
with the coin opening when the coin conveyor is in a rest position,
a rotating member rotationally engaged to the shaft and spaced from
the coin conveyor, such that the rotating member rotates with the coin conveyor
along a rotational path,
a movable arm comprising a latch and a magnet, mounted between the
coin conveyor and the rotating member in rotationally fixed relation to the cover
plate,
the arm being movable between
a locked position in which the latch impinges into the rotational
path of the rotating member to substantially prevent rotation of
the rotating member, and
an unlocked position in which the latch is retracted from the
rotational path of the rotating member to permit rotation of the
rotating member,
the arm being biased to the locked position by a biasing force when the
coin conveyor is in the rest position,
whereby when a coin or token having a magnetic component is
deposited into the coin receiving portion, an attractive force of the magnet on the
coin or token is sufficient to overcome the biasing force and move the arm to the
unlocked position permitting rotation of the rotating member, such that rotation of
the handle rotates the coin conveyor to convey the coin or token from the rest
position to a coin ejection position.
2. The mechanism of claim 1 in which a stationary back plate is mounted
to the cover plate between the coin conveyor and the arm.

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3. The mechanism of claim 2 in which the arm is maintained in rotationally fixed relation to the cover plate by one or more pins projecting from the back plate and abutting the arm.
4. The mechanism of claim 1 in which the arm is mounted about the shaft.
5. The mechanism of claim 1 in which the arm comprises a fulcrum and moves between the locked position and the unlocked position by rocking about the fulcrum.
6. The mechanism of claim 1 in which the rotating member comprises a disc comprising an opening or recess into which the latch engages to lock the mechanism against rotation.
7. The mechanism of claim 6 in which the latch extends from an outer end of the arm.
8. The mechanism of claim 7 in which the recess is larger than the latch, permitting a slight rotation of the mechanism when the arm is in the locked position.
9. The mechanism of claim 8 in which the arm is biased to the locked position by a magnetic mass lodged in the rotating member, which mass is sufficiently small that the attractive force exerted by the magnet on the mass is less than the attractive force exerted by the magnet on a coin or token having a magnetic component.
10. The mechanism of claim 1 in which the coin receiving portion comprises a recess in the coin conveyor.
11. An apparatus for dispensing merchandise having a coin mechanism comprising

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a stationary cover plate having a coin opening,
a handle fixed to a shaft extending through the cover plate,
a dispensing gear mounted on the shaft,
a coin conveyor comprising a coin receiving portion, rotationally engaged to the shaft such that the coin receiving portion is in substantial alignment with the coin opening when the coin conveyor is in a rest position,
a rotating member rotationally engaged to the shaft and spaced from the coin conveyor, such that the rotating member rotates with the coin conveyor along a rotational path,
a movable arm comprising a latch and a magnet, mounted between the coin conveyor and the rotating member in rotationally fixed relation to the cover plate,
the arm being movable between
a locked position in which the latch impinges into the rotational path of the rotating member to substantially prevent rotation of the coin conveyor, and
an unlocked position in which the latch is retracted from the rotational path of the rotating member to permit rotation of the coin conveyor,
the arm being biased to the locked position by a biasing force when the coin conveyor is in the rest position,
whereby when a coin or token having a magnetic component is deposited into the coin receiving portion, an attractive force of the magnet on the coin or token is sufficient to overcome the biasing force and move the arm to the unlocked position permitting rotation of the rotating member, such that rotation of the handle rotates the coin conveyor to convey the coin or token from the rest position to a coin ejection position and rotates the dispensing gear to dispense merchandise from the merchandise-dispensing apparatus.

12. The apparatus of claim 11 in which a stationary back plate is mounted to the cover plate between the coin conveyor and the arm.

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13. The apparatus of claim 12 in which the arm is maintained in rotationally fixed relation to the cover plate by one or more pins projecting from the back plate and abutting the arm.
14. The apparatus of claim 11 in which the arm is mounted about the shaft.
15. The apparatus of claim 11 in which the arm comprises a fulcrum and moves between the locked position and the unlocked position by rocking about the fulcrum.
16. The apparatus of claim 11 in which the rotating member comprises a disc comprising an opening or recess into which the latch engages to lock the mechanism against rotation.
17. The apparatus of claim 16 in which the latch extends from an outer end of the arm.
18. The apparatus of claim 17 in which the recess is larger than the latch, permitting a slight rotation of the mechanism when the arm is in the locked position.
19. The apparatus of claim 18 in which the arm is biased to the locked position by a magnetic mass lodged in the rotating member, which mass is sufficiently small that the attractive force exerted by the magnet on the mass is less than the attractive force exerted by the magnet on a coin or token having a magnetic component.
20. The apparatus of claim 11 in which the coin receiving portion comprises a recess in the coin conveyor.

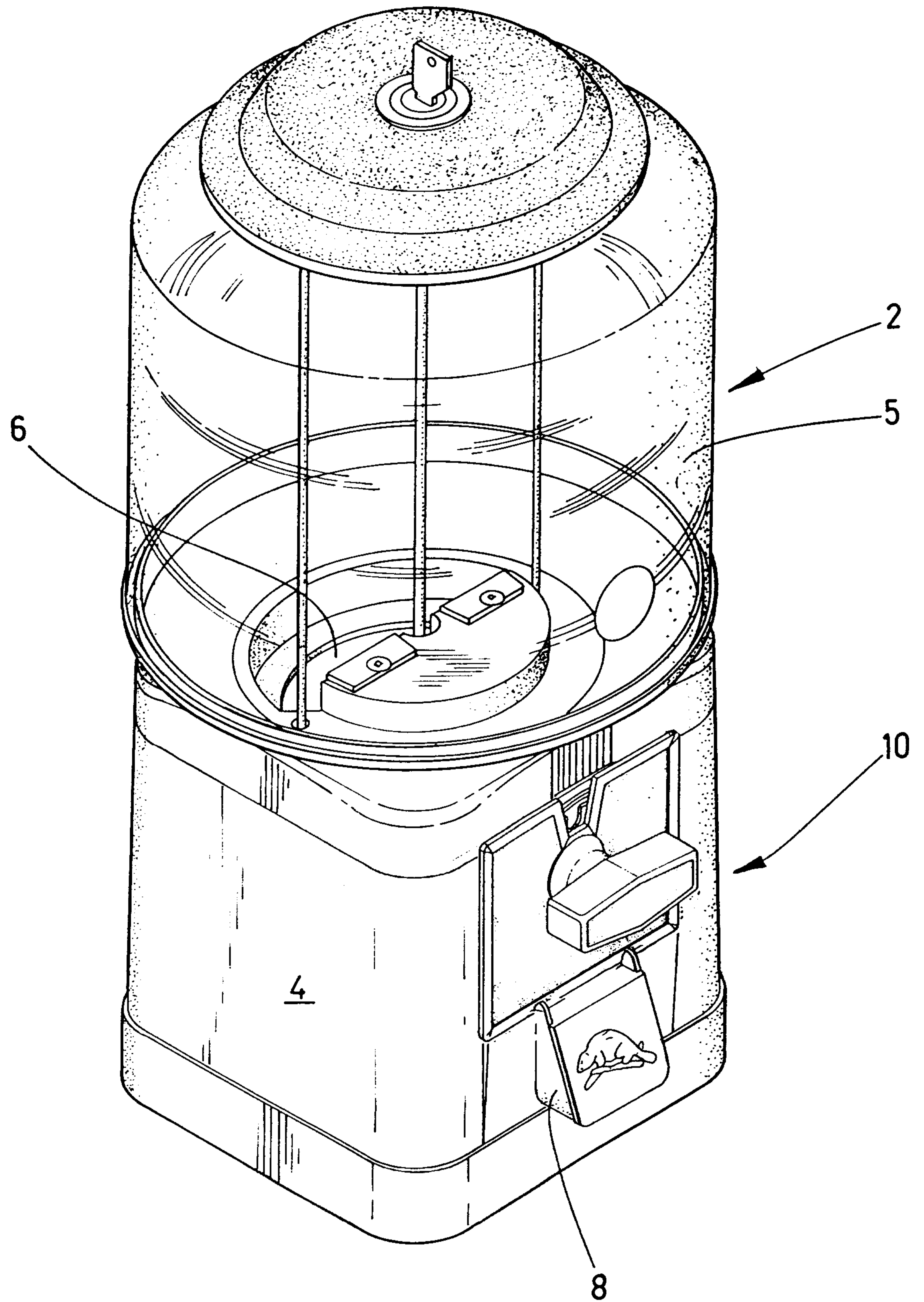
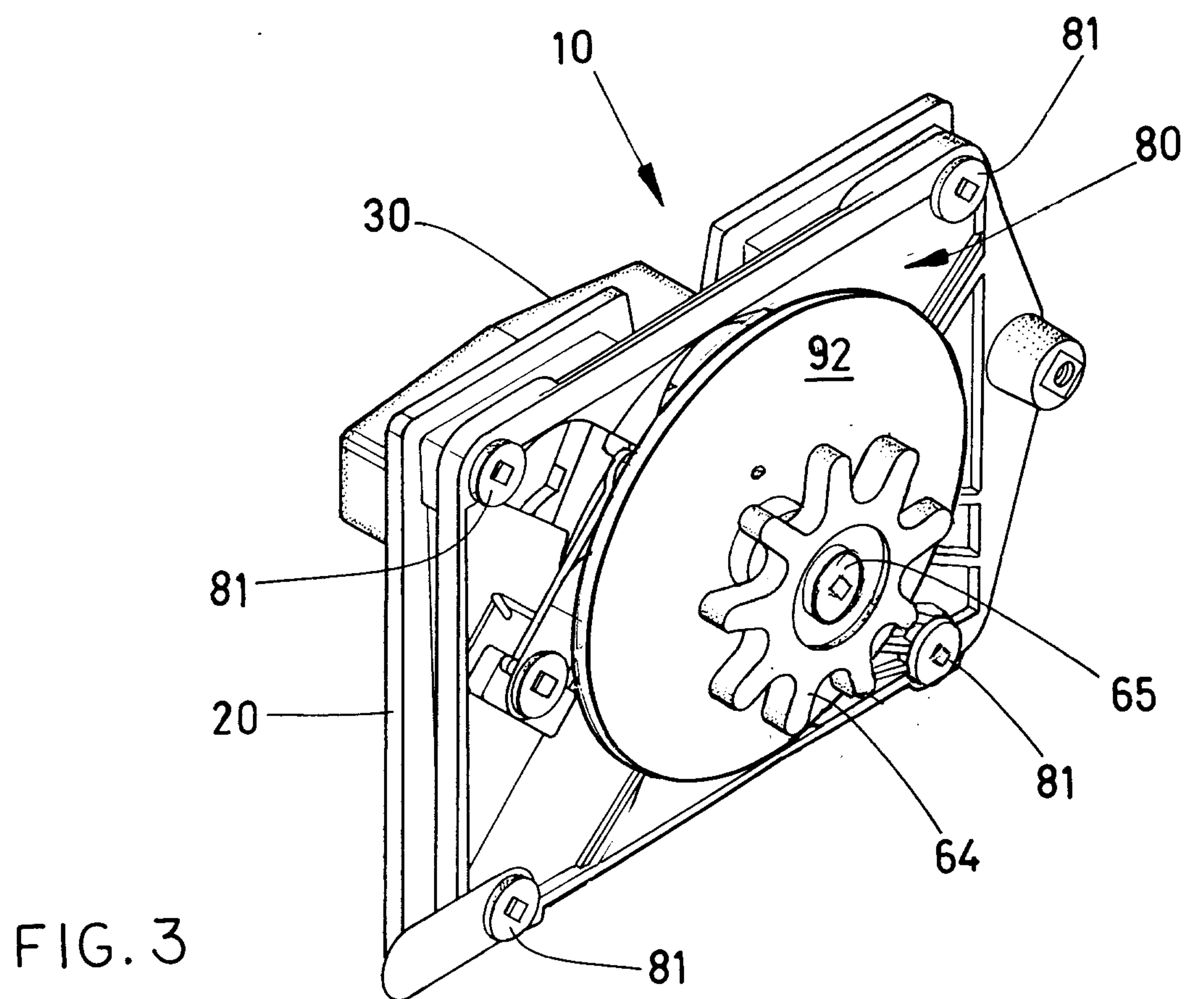
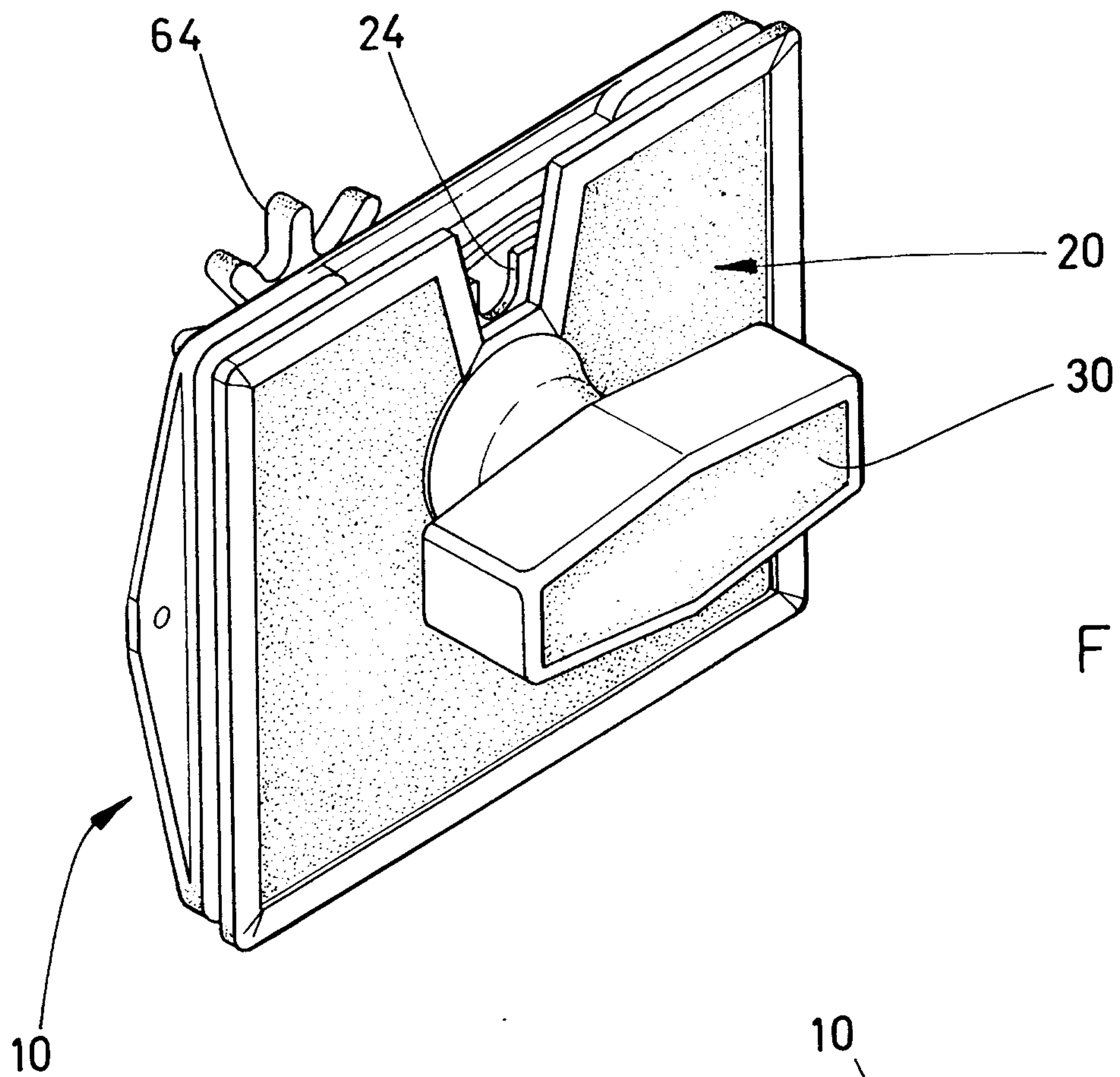
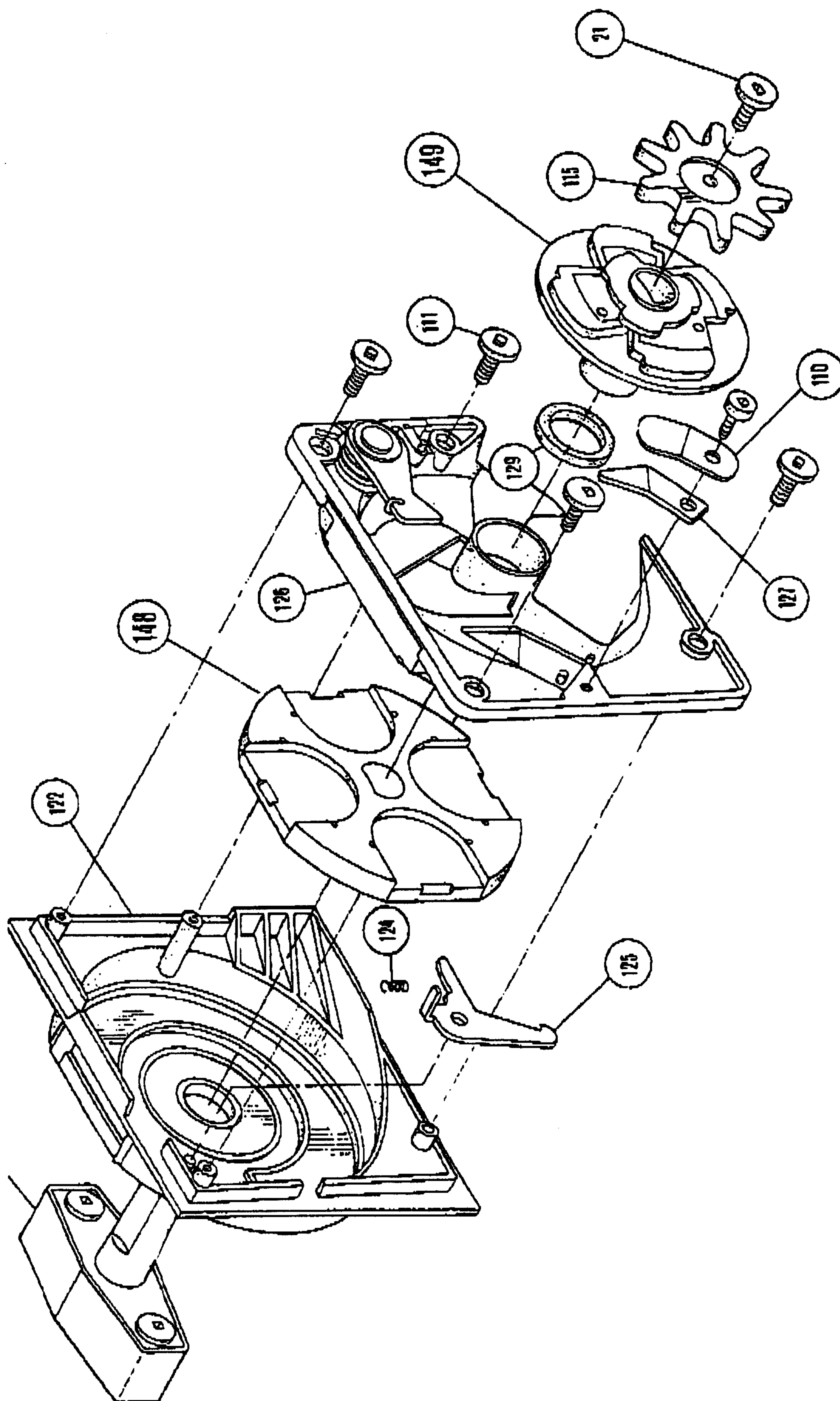


FIG. 1





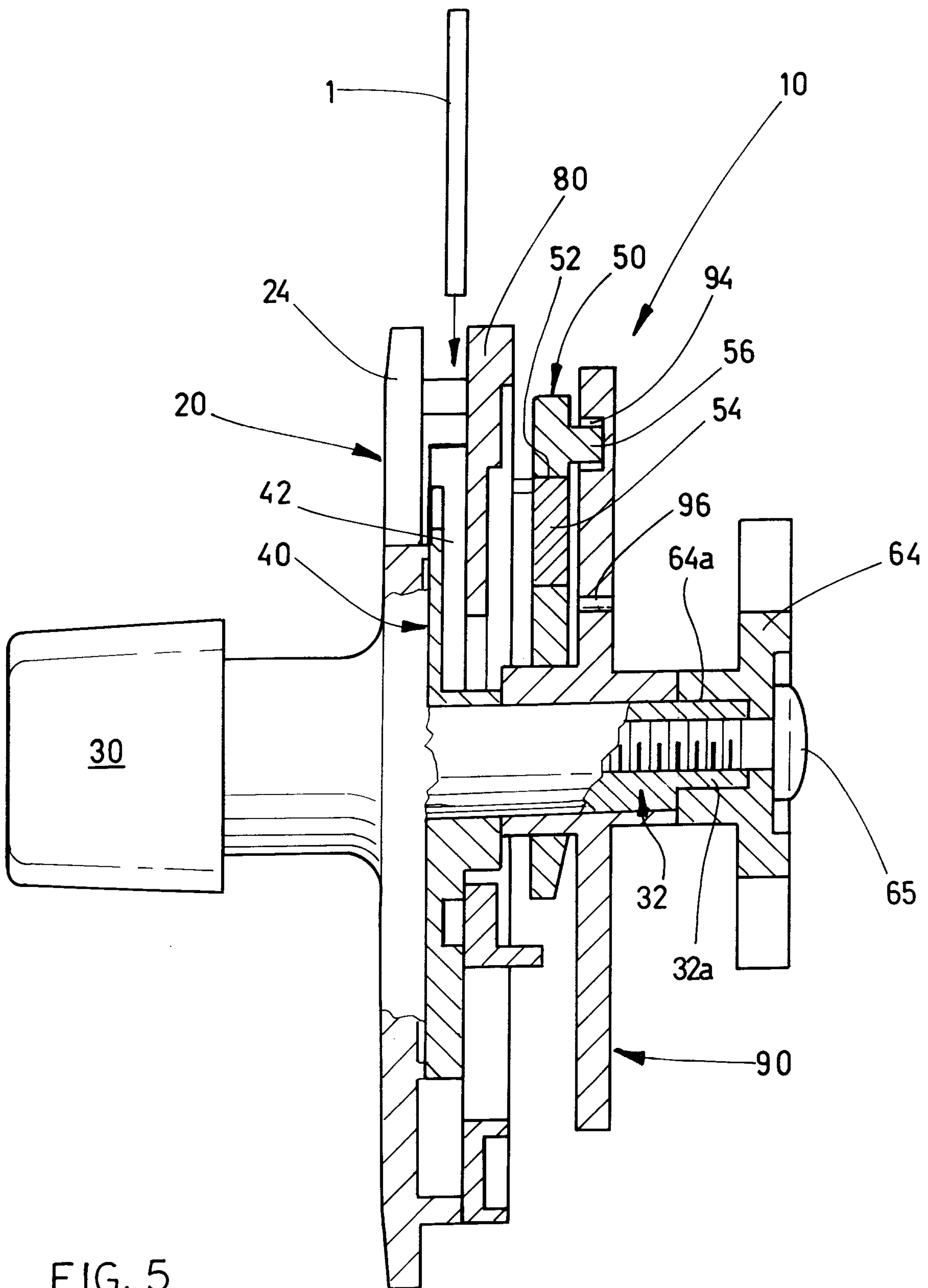


FIG. 5

