March 27, 1962 M. S. CURTIS 3,026,743

MEMORY WHEEL

Filed April 15, 1960 2 Sheets-Sheet 1

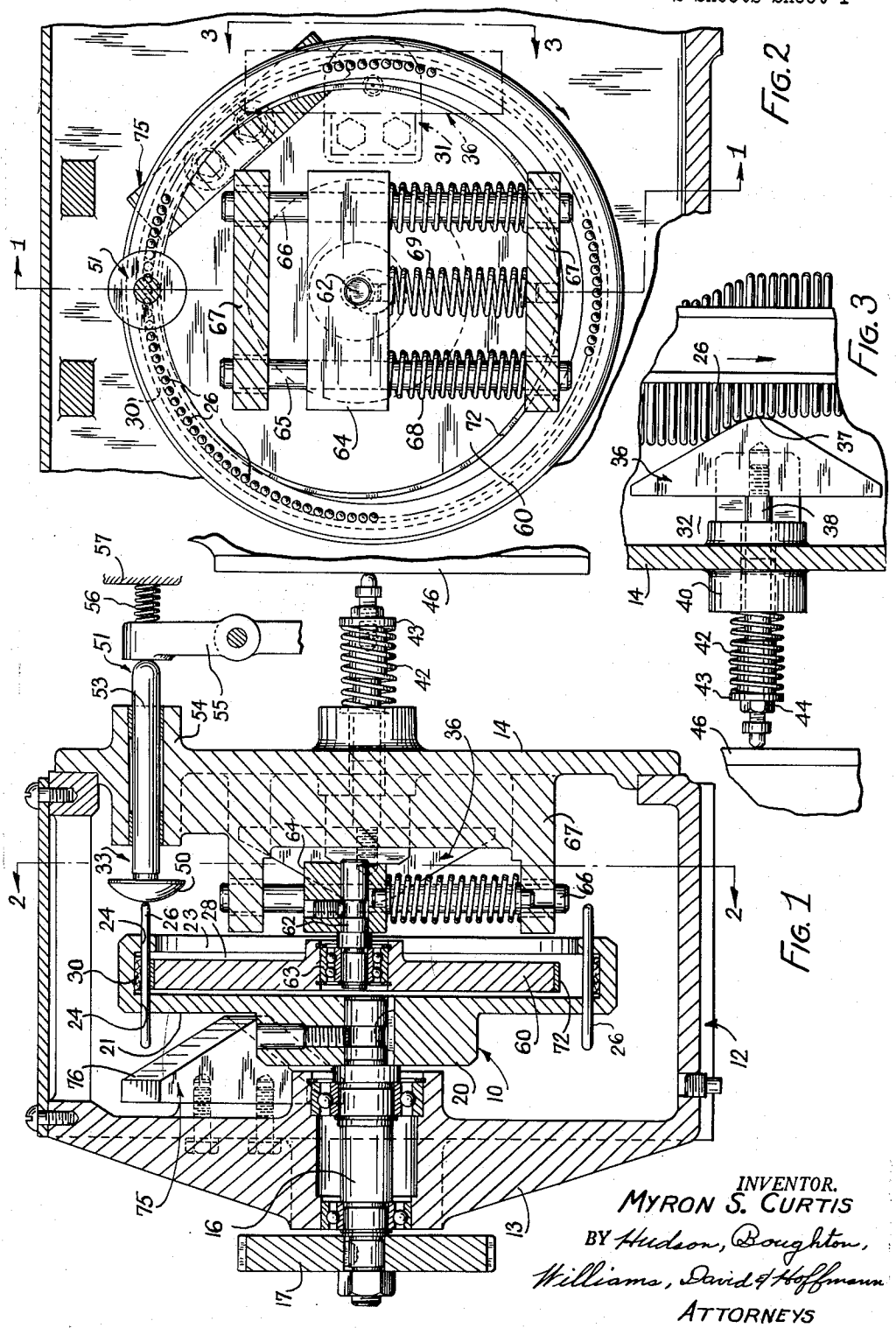


FIG. 1

FIG. 3

FIG. 2

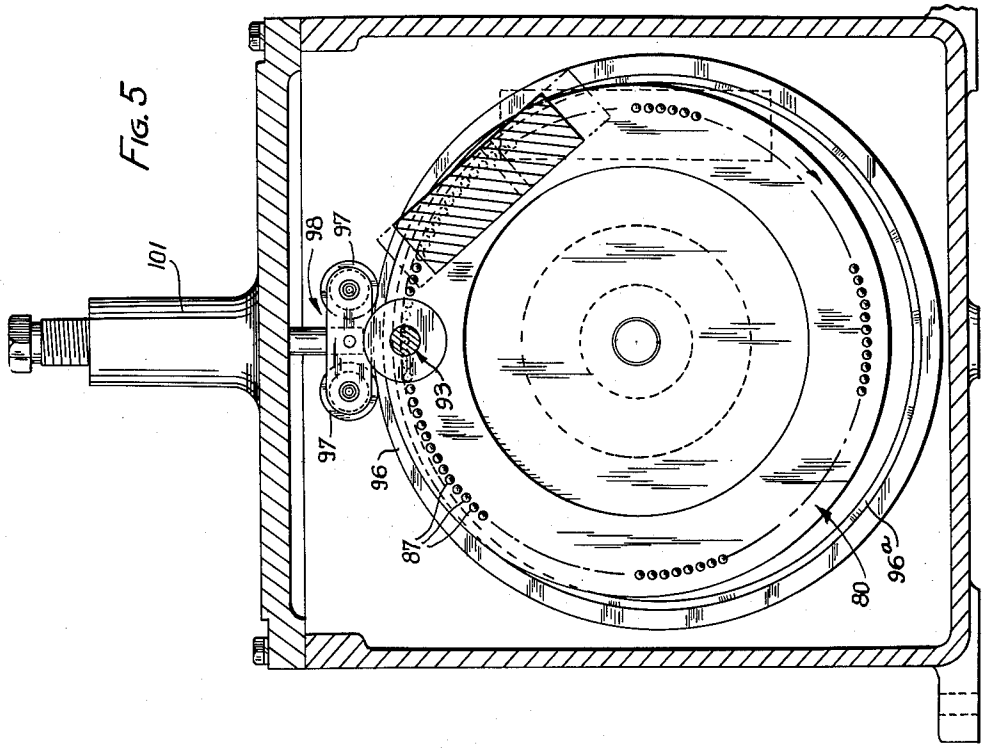
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FIG. 5



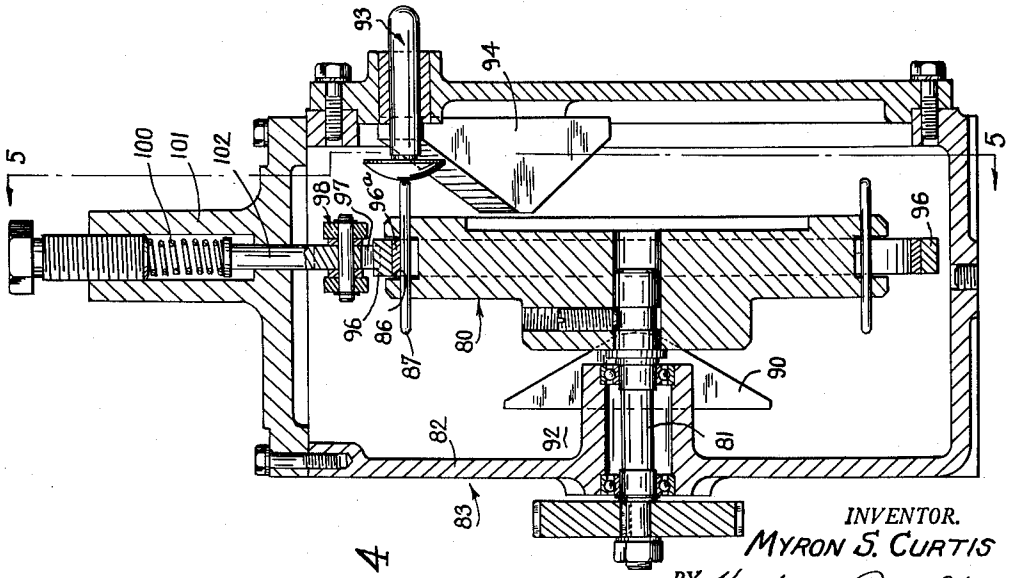


FIG. 4

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MEMORY WHEEL

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The present invention relates to a memory wheel which comprises a circular array of a plurality of axially settable pins and, more particularly, to such a wheel having means for locking the pins during read-out.

An important object of the present invention is to provide a new and an improved memory wheel of the type in which a plurality of axially slidable memory pins are arranged in a circular array, the wheel having novel and improved means for locking the pins against movement at a read-out station, which locking means is sure in operation and is of compact, relatively simple construction.

In accordance with one feature of the present invention, a rotatable locking member having a circular periphery is supported eccentrically with respect to the circular array of pins and engages the pins as they are moved into read-out position to lock the pins against axial movement. The locking member is supported for radial movement toward and from the point of engagement with the array of pins and is urged toward engagement with the array of pins at the read-out point.

Further objects and advantages of the present invention will be apparent from the following detailed description of the preferred embodiment thereof made with reference to the accompanying drawings forming a part of the present specification in which:

FIG. 1 is a sectional view through a memory wheel device embodying the present invention and taken approximately along line 1—1 of FIG. 2, looking in the direction of the arrows;

FIG. 2 is a sectional view of the memory wheel device of FIG. 1 taken approximately along line 2—2 of FIG. 1 and looking in the direction of the arrows;

FIG. 3 is a fragmentary sectional view taken approximately along line 3—3 of FIG. 2 and looking in the direction of the arrows;

FIG. 4 is a sectional view through a memory wheel device embodying the present invention but of a different construction than the device shown in FIGS. 1–3; and

FIG. 5 is a sectional view through the memory wheel device of FIG. 4 taken approximately along line 5—5 of FIG. 4 and looking in the direction of the arrows.

Referring to the drawings, the memory wheel device shown in FIGS. 1–3 comprises a wheel 10 rotatably supported within a casing 12 having side walls 13, 14, as well as top and bottom walls. The memory wheel 10 is keyed to a shaft 16 rotatably supported in the side wall 13 and extending both inwardly and outwardly thereof. The outer end of the shaft 16 has a gear 17 keyed thereto, the gear 17 being driven to effect a rotation of the memory wheel 10.

The memory wheel 10 comprises a hub 20 which is fast on the shaft 16 and a radial flange 21 which extends radially from the side of the hub adjacent the inner end of shaft 16. An annular flange 22 extends axially from the radial flange 21 at the outer periphery thereof and in a direction away from the hub 20 and the outer end of the flange 22 is turned inwardly to provide an annular inturned portion 23. The inturned portion 23 could be a separate piece if desired. The annular inturned portion 23 and the radial flange 21 are provided with a plurality of pairs of aligned openings 24 arranged in a circular array with each pair of aligned openings 24 receiving a memory pin 26. Each memory pin 26 is slidable in the corresponding openings 24 and extends axially outwardly of each side of the wheel 10, i.e., outwardly from the radial flange 21 and outwardly from the inturned annular portion 23. The radial flange 21 and the inturned annular portion 23 define an inwardly facing channel 28 and there is a clearance space between the bottom of the channel 28 and the pins 26. Disposed in the clearance between the bottom of the channel 28 and the pins 26 is a band of friction material 30, which is preferably a feltlike material and which frictionally engages the pins 26 to resist displacement thereof.

In memory devices of the type shown in the drawings the pins 26 are displaced axially at an input station to set the pins in a position indicative of the magnitude of the condition to be remembered and the pins, when moved to the read-out station, position a read-out member in accordance with the axial position of the pins. In the device shown in FIGS. 1–3, the pins are set at an input, or read-in, station 32 and are then moved to a read-out station 33. The input station 32 is located adjacent the right-hand side of the wheel 10, as the latter is viewed in FIG. 1 and the read-in station is shown in detail in FIG. 3.

As is best shown in FIG. 3, the read-in station comprises a triangularly-shaped, or wedge-shaped setting member 36 having a rounded apex portion 37 adapted to engage the right-hand end of the pins 26, as the latter are viewed in FIG. 1, and the left-hand ends of the pins, as viewed in FIG. 3 to shift the pins from a datum position. The setting member 36 is secured to the inner end of a rod 38 slidably supported in a boss 40 formed in the side 14 of the casing 12 and extends outwardly of the casing. The rod 38 is axially movable to position the setting member 36. The rounded apex of the setting member 36 is normally positioned in the path of the pins of the memory wheel and, as the pins are moved past the setting member 36 upon rotation of the wheel 10, the pins engage the rounded apex 37 and are moved inwardly to displace the pins axially a distance corresponding to the position of the setting member 36. The axial position of the pins 26 after passing the setting member 36 is indicative of the position of the setting member at the time that the pins pass the rounded apex 37.

The rod 38 is urged axially to move the setting member 36 away from the pins 26 by a spring 42 disposed about the shaft 38 outwardly of the boss 40. The spring 42 engages a washer 43 held on the shaft by a nut 44 threaded onto a reduced portion of the shaft. The outer end of the shaft 38 engages an input member 46 which is displaced in accordance with the condition which varies and which is to be recorded on the memory wheel 10. If the member 46 is moved toward the memory device, the shaft 38 is moved inwardly and the pins 26 are set farther to the right, as the latter are viewed in FIG. 3, by the setting member 36 and if the member 46 is moved away from the memory device, the shaft 38 follows by reason of the spring 42 and the pins 26 are not set as far inwardly as was previously the case.

When the pins 26 are carried by the wheel to the read-out station 33 upon rotation of the wheel in a counterclockwise direction as viewed in FIG. 2, they engage a rounded head 50 of a read-out member 51. The pins 26 position the read-out member 51 as they move thereby with the read-out member 51 being urged toward engagement with the adjacent ends of the pins 26. In the illustrated embodiment, the read-out member 51 is disposed on the same side of the wheel as the input station 32.

The read-out member 51, in addition to the head 50, includes a rodlike portion 53 which is supported in a boss 54 in the side 14 of the casing 12 so as to be movable axially relative to the casing. The outer end of the rod-

like portion 53 engages an arm of a pivoted lever 55 which is operated about its pivot by the movement of the read-out member 51. The read-out member 51 is urged toward the pins 26 by spring means which is indicated as comprising a spring 56 disposed between the lever 55 and a frame member 57.

As the pins move into engagement with the read-out member 51, the read-out member will apply a force to the pins which will tend to shift the pins axially. This, however, would destroy the setting of the pins. In accordance with the present invention, the pins are locked in their axial position as they move into their read-out position by a rotatable circular locking member or disk 60 supported eccentrically with respect to the circular array of pins 26 and disposed to engage the pins at the read-out station. As is best shown in FIG. 1, the circular locking member 60 is disposed within the annular flange 22 and inside of the array of pins 26. The locking member 60 has a smaller diameter than that of the circular array of pins 26 and is supported with its axis offset from the axis of the wheel 10 and that of the circular array of pins so that the periphery of the locking member 60 engages the pins 26 as they move into the read-out station. The locking member 60 is rotatably supported on a shaft 62 by a ball bearing 63. The shaft 62 is mounted in a carrier block 64 supported for movement by guide rods 65, 66. The guide rods 65, 66 extend parallel to the radius of the circular locking member 60 through the point of engagement of the locking member with the pin 26 at the read-out station and support the carrier block 63 and, in turn, the locking member 60 for radial movement toward and away from engagement with the pin at the read-out station.

The guide rods 65, 66 are, in the illustrated embodiment, supported between vertically spaced shelves 67 extending outwardly from the inner side of the side wall 14 and a spring 68 is disposed about each of the guide rods 65, 66 and the lower shelf 67 and urge the carrier block 64 and, in turn, the locking member 60 toward engagement with the pins at the read-out station. An auxiliary spring 69 may be disposed between the block 64 and lower shelf 67, if desired.

From the foregoing description, it can be seen that the outer periphery of the locking disk 60 is urged into engagement with the pin at the read-out station 33 and will frictionally engage the pin to resist axial movement of the pin due to the forces applied by the read-out disk 51. If desired, the periphery of the locking disk 60 may be provided with a band of frictional material 72. Because of the different diameters of the circular array of pins and of the locking disk 60, the pins are clear of the locking disk before and after the read-out station. To facilitate movement of the pins to and from the read-out station 33, the locking disk 60 is capable of rotation with the pins.

After the pins 26 pass the read-out station 33, the left-hand ends of the pins engage a reset cam 75 supported adjacent the left-hand side of the memory wheel 10, as the latter is viewed in FIG. 1. The reset cam 75 has an inclined surface 76 which causes the pins to be reset to a predetermined datum position with respect to the memory wheel 10 to position the pins to again be displaced by the setting member 36.

Referring to FIGS. 4 and 5, a memory wheel device is shown therein which embodies certain features of the present invention but which is of somewhat different construction from that shown in FIGS. 1 to 3. In the memory wheel device of FIGS. 4 and 5, a memory wheel 80 is fixed to a shaft 81 rotatably supported in a side wall 82 of a casing 83 which houses the wheel 80. The wheel 80 has an annular U-shaped groove 86 in the periphery thereof which defines an outwardly facing channel and a plurality of memory pins 87 are arranged in a circular array about the memory wheel 80 and each of which pass through aligned openings in the side walls of the annular groove 86 to extend outwardly of both sides of the memory wheel. The pins are set by a setting member 90 as they pass a read-in station 92 located adjacent the left-hand side of the wheel, as the wheel is viewed in FIG. 4, and the pins which have been set at the station 92 control the axial displacement of a read-out member 93 which corresponds to the read-out member 51 of the first-described embodiment, the wheel being rotated in a clockwise direction, as viewed in FIG. 5. After passing the read-out member 93, the pins are rotated past a reset member 94 which resets the pins to the predetermined datum position preparatory to their again being set by the setting member 90. As thus far described, the memory wheel device is substantially the same as the first-described embodiment, with the exception that the setting and read-out stations are on opposite sides of the memory wheel.

In accordance with one feature of the present invention, a member supported eccentrically with respect to the circular array of the pins of the memory wheel 80 is provided for locking the pins in position as they move to the read-out station. In the embodiment of FIGS. 4 and 5, the locking member comprises a ring 96 which is of larger diameter than the outside diameter of the circular array of pins 87 and which is adapted to be received in the annular groove 86. The inner periphery of the ring 96 engages the pin in read-out position to frictionally hold the pin and the inner periphery may comprise a friction band 96a. The read-out station is, in the illustrated embodiment, at the uppermost point of the memory wheel 80 and the ring 96 hangs on the pins 87 at the top of the memory wheel. The ring 96 is urged into engagement with the array of pins 87 at the top of the memory wheel, i.e., at the read-out station, by a pair of rollers 97 supported in a yoke 98 and urged by a spring 100 into engagement with the outer periphery of the ring 96 at the read-out station. The spring 100 is disposed in a boss 101 extending upwardly from the top of the casing 83 and engages a rod 102, which extends upwardly from the yoke 98 and urges the rod 102, the yoke 98, and the rollers 97 downwardly toward engagement with the outer periphery of the ring 96. It will be readily understood that the pressure of the spring 100 acting on the pins through the ring 96 will lock the pins against axial movement as they are rotated to the read-out position and because of the eccentric nature of the inner periphery of the ring and the circular array of pins, the pins 87 will be free to move axially, insofar as the ring 96 is concerned, both before and after the read-out station. It will be understood that the ring 96 may engage more than one pin as the pins approach the read-out station. Furthermore, since the ring 96 is capable of movement, when the force between the pins and ring 96 reaches a predetermined magnitude, the ring 96 will move with the pins.

From the foregoing description, it can be seen that the present invention provides a new and an improved memory wheel device including a plurality of pins supported in a circular array and means for locking the pins in an axial position as the pins are moved past a read-out station. While embodiments have been described in detail, further modifications, constructions, and arrangements will be apparent to those skilled in the art and it is hereby my intention to cover all such modifications, constructions, and arrangements which fall within the ability of those skilled in the art and within the scope and spirit of the present invention.

Having described my invention, I claim:

1. A memory wheel device comprising a rotatable wheel having a plurality of axially extending memory pins arranged in a circular array about the axis of the wheel, said pins extending outwardly of each side of said wheel, an input station adjacent said wheel, means at said input station for variably displacing the pins of said wheel axially as said pins are moved past said station upon rota-

tion of said wheel to set the pins in accordance with a variable condition, a read-out station adjacent said wheel, means at said read-out station for locking said pins against axial movement comprising a substantially rigid circular locking member of different diameter from said circular array, support means mounting said locking member eccentrically with respect to said array of pins with the periphery of said locking member engaging said array of pins at said read-out station and rotatably supporting said locking member, said support means including means supporting said locking member for radial movement toward and away from its point of engagement with said array of pins at said read-out station and means yieldably urging said locking member into engagement with said pins at said read-out station.

2. A memory wheel device comprising a rotatable wheel having a plurality of axially extending memory pins arranged in a circular array about the axis of the wheel, said pins extending outwardly of each side of said wheel, an input station adjacent said wheel, means at said input station for selectively displacing the pins of said wheel axially as said pins are moved past said station upon rotation of said wheel, a read-out station adjacent said wheel including a read-out member urged into engagement with the end of the pin at said read-out station, means at said read-out station for locking said pins against axial movement while engaged by said read-out member comprising a circular locking disk of smaller diameter than said circular array, and support means rotatably mounting said locking disk within said array and eccentrically with respect to said array with the outer periphery of said locking disk engaging said pins when said pins are in position to be engaged by said read-out member at said read-out station, said support means including means supporting said locking disk for radial movement toward and away from its point of engagement with said array of pins at said read-out station and means yieldably urging said locking member toward engagement with the pin at said read-out station.

3. A memory wheel device according to claim 2 wherein said wheel comprises a hub having a radial flange extending radially outwardly from the hub and an annular flange extending axially outwardly from said radial flange at the outer periphery of said radial flange, said annular flange having a radial inwardly extending outer end part which defines with said radial and annular flanges an annular channel opening inwardly of said wheel, said pins being slidably received in aligned bores in said radial flange and said end part and extending across said channel, said disk being disposed within said annular flange and engaging the inner side of said array of pins.

4. A memory wheel device as defined in claim 3 wherein a band of friction material is closely fitted between said pins and the bottom of said channel.

5. A memory wheel device comprising a rotatable wheel having a plurality of axially extending memory pins arranged in a circular array about the axis of the wheel, said pins extending outwardly of each side of said wheel, an input station adjacent said wheel, means at said input station for selectively displacing the pins of said wheel axially as said pins are moved past said station upon rotation of said wheel, a read-out station adjacent said wheel including a read-out member urged into engagement with the end of the pin at said read-out station, means at said read-out station for locking said pins against axial movement while engaged by said read-out member comprising a circular locking disk of smaller diameter than said circular array, and support means rotatably mounting said locking disk within said array and eccentrically with respect to said array with the outer periphery of said locking disk engaging said pins when said pins are in position to be engaged by said read-out member at said read-out station, said support means comprising a carrier block, a shaft extending parallel to the axis of said array but offset therefrom mounted on said block and rotatably supporting said disk, means supporting said block for movement parallel to the radius of said disk through a pin at said read-out station, and spring means yieldably urging said carrier block toward said read-out station.

6. A memory wheel device according to claim 5 wherein said wheel comprises a hub having a radial flange extending radially outwardly from the hub at one end thereof and an annular flange extending axially outwardly away from said one end at the outer periphery of said radial flange, said annular flange having a radial inwardly extending outer end part which defines with said radial and annular flanges an annular channel opening inwardly of said wheel, said pins being slidably received in aligned bores in said radial flange and said end part and extending across said channel, said disk being disposed within said annular flange and engaging the inner side of said array of pins.

7. A memory wheel device as defined in claim 6 wherein a band of friction material is closely fitted between said pins and the bottom of said channel.

8. A memory wheel device comprising a rotatable wheel having a plurality of axially extending memory pins arranged in a circular array about the axis of the wheel, said pins extending outwardly of each side of said wheel, an input station adjacent said wheel, means at said input station for variably displacing the pins of said wheel axially to set the pins in accordance with a variable condition as said pins are moved past said station upon rotation of said wheel, a read-out station adjacent said wheel including a read-out member urged into engagement with the end of the pins when in read-out position, means at said read-out station for locking said pins against axial movement while in engagement with said read-out member comprising a rigid rotatable locking ring of larger inside diameter than said circular array and disposed about said array of pins, the inner periphery of said ring engaging the pins when at said read-out station, and biasing means urging said ring into engagement with said array of pins at said read-out station and supporting said ring for rotation.

9. A memory wheel device as defined in claim 8 wherein said ring is supported by said array of pins and by roller means comprising a part of said biasing means and engaging the outer periphery of said ring at said read-out station, said roller means being supported for movement toward and away from said ring and said biasing means including a spring acting to urge said roller means into engagement with said ring.

10. A memory device as defined in claim 8 wherein said wheel rotates in a vertical plane and said read-out station is at the top of the wheel and said ring is hung on the top of said array of pins.

11. A memory device as defined in claim 10 wherein said biasing means comprises a roller which engages the outside periphery of said locking ring at said read-out station and a spring acting on said roller and urging it toward said array.

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