Feb. 11, 1958 ÅKE MAGNUS LAMM 2,823,323

MAGNETICALLY ACTUATED MECHANISM FOR ARTICLE DISPLAY

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Fig. 1.

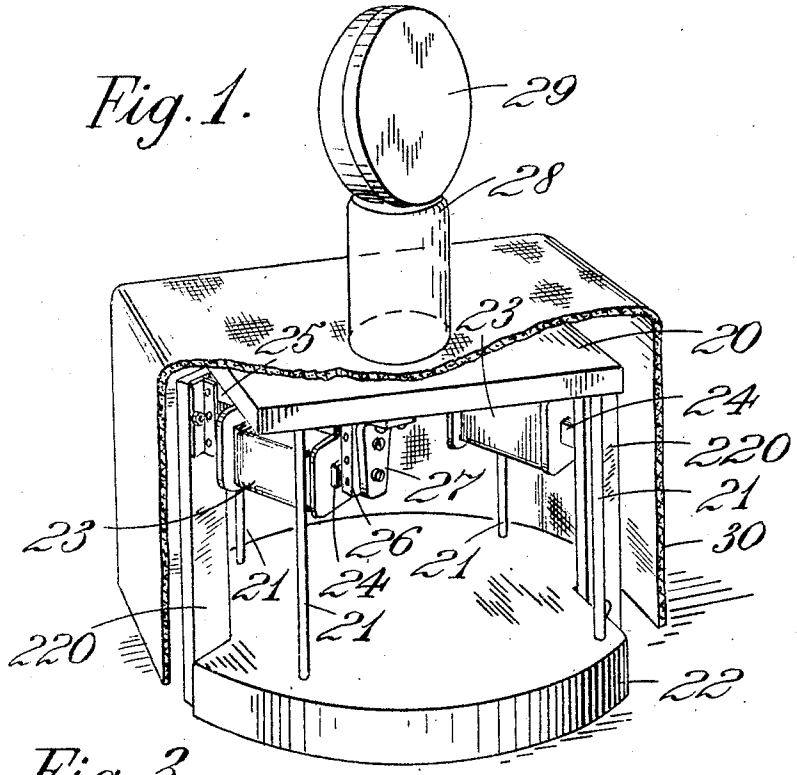



Fig. 3.

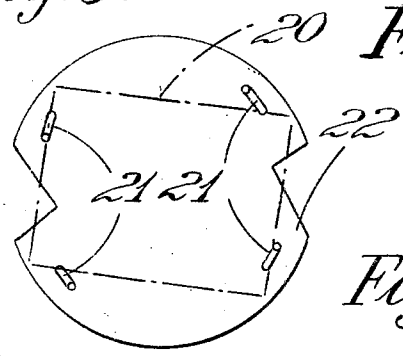



Fig. 2.

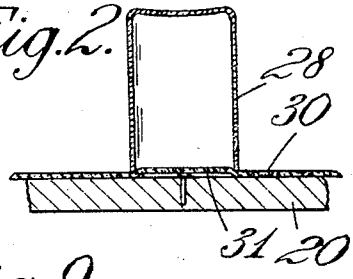



Fig. 9.

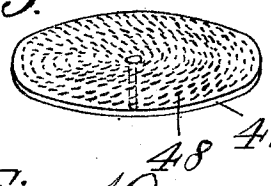



Fig. 4.

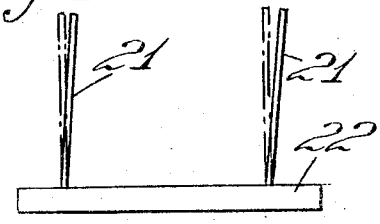
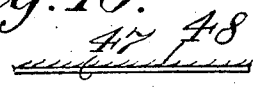



Fig. 10.




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Fig. 5.

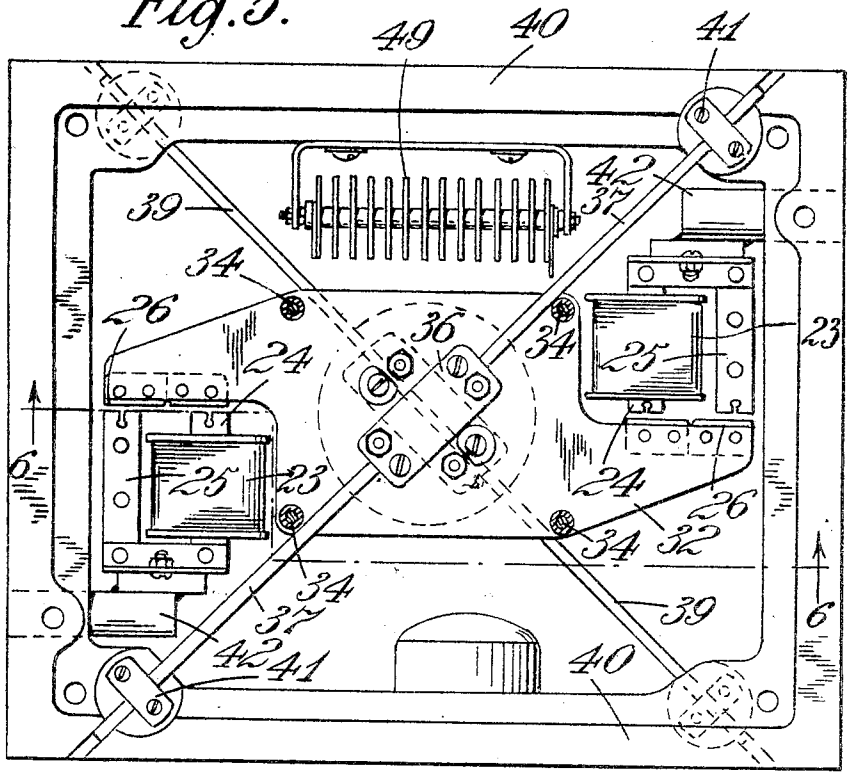
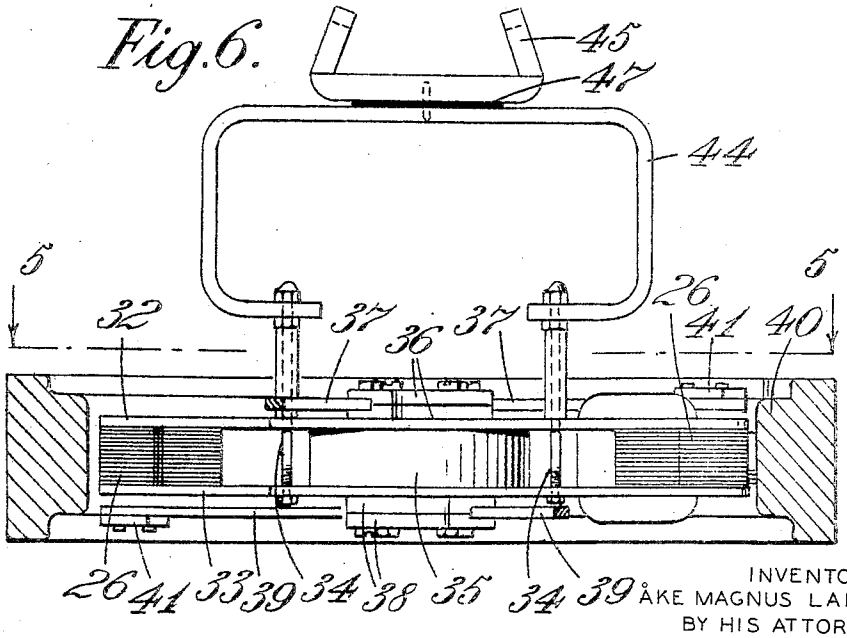



Fig. 6.




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MAGNETICALLY ACTUATED MECHANISM FOR ARTICLE DISPLAY

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Fig. 7.

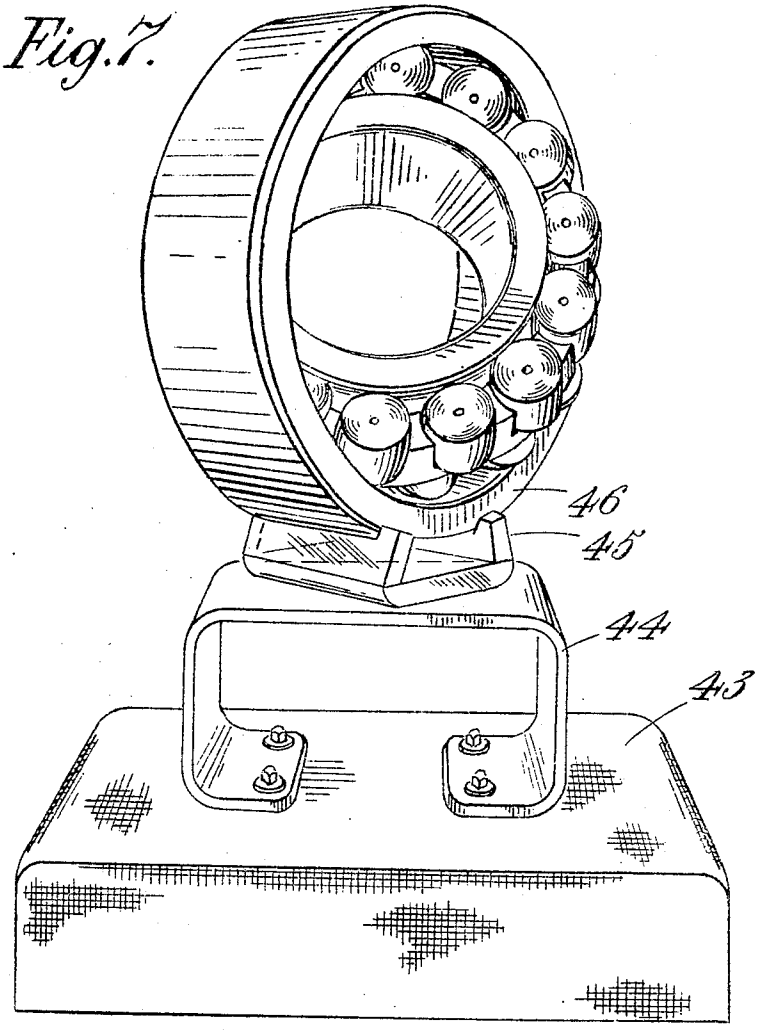
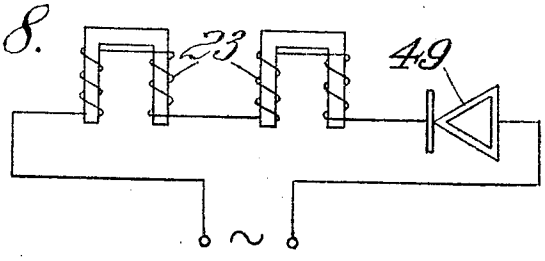



Fig. 8.




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United States Patent Office 2,823,323 Patented Feb. 11, 1958



2,823,323

# MAGNETICALLY ACTUATED MECHANISM FOR ARTICLE DISPLAY

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Application June 25, 1952, Serial No. 295,579

Claims priority, application Great Britain July 26, 1951

6 Claims. (Cl. 310—20)

This invention is for improvements in or relating to display mechanism for articles and goods. The invention is concerned with mechanism which rotates the exhibits so that they may be conveniently viewed from different angles. As is well known, to arouse interest, the exhibits are often rotated in such a manner as to make it difficult or impossible for an observer to discover the manner in which the rotary motion is imparted, and it is an object of the present invention to achieve this effect in an improved manner.

According to the primary feature of the invention, the display mechanism for rotating the exhibit comprises a supporting member on which the exhibit or a cradle carrying the exhibit may rest, means for imparting oscillations to the supporting member through a small angle around substantially the same axis as that around which the exhibit is to rotate which oscillations are such that the angular speed and/or the acceleration of movement is greater in one direction than in the other and the nature of the supporting surface of said supporting member is so chosen, having regard both to the inertia of the exhibit and the cradle when the latter is used and to the nature of the supported surface of the exhibit or of the cradle which carries it that during the slower of the two movements of the supporting member the exhibit is caused wholly or partly to follow the movement of said member but during the faster of the two movements the inertia of the exhibit and of the cradle when the latter is used prevents it or them from following the movement of the supporting member to the same angular extent as during the slower movement.

The exhibit will thus be caused to move forward in the direction of the slower of the two movements of the supporting member.

Conveniently, the supporting member is resiliently mounted and is subjected to the action of an electromagnet energised by an intermittent direct current, which mounting and electro-magnet are so arranged that the electro-magnet imparts the slower of the two movements to the supporting member, and the resilient mounting effects the faster of the two movements in the intervals between the energising of the electro-magnet. The resilient mounting for the supporting member may take the form of spring-steel wires which flex to permit the slower of the two movements of the supporting member i. e. under the electro-magnetic impulses, and which themselves impart the faster of the two movements by returning to their unflexed condition in the intervals between the said impulses. The aforesaid wires may take the form of upstanding posts arranged in an annulus about the axis of oscillation of the supporting member, which axis is substantially vertical. Alternatively, these wires may lie in substantially horizontal planes and intersect the axis of oscillation of the supporting member, which axis is substantially vertical.

According to another feature of the invention, means are provided whereby the friction between the supporting member and the exhibit is greater during the slower of



the two movements of the supporting member than during the faster movements. For instance, the mounting for the oscillatory supporting member may be so arranged that during the slower of the two movements of the supporting member the latter is urged towards the exhibit and during the faster movements is urged away from the exhibit. This urge tends to increase the friction during the slower movements and to reduce the friction during the faster movements, thus promoting the forward movement of the exhibit. If the spring posts are upstanding, they may be so arranged at an angle to the vertical that during the slower of the two movements of the supporting member they cause the latter to rise slightly and during the faster movements they cause it to fall slightly. Another way of achieving the aforesaid differential friction, is to have a washer with an obliquely circularly arranged textile pile so located between the supporting member and the exhibit that the fibres of the pile are concentrically arranged about the axis of oscillation in such manner as to offer greater friction during the slower of the two movements of the supporting member than during the faster movements.

For a more complete understanding of the invention, there will now be described, by way of example only and with reference to the accompanying drawings, certain constructional forms of display mechanism according to the invention. It is to be understood, however, that the invention is not restricted to the precise constructional details set forth.

In these drawings:

Figure 1 is a perspective view of one form of display mechanism according to the invention,

Figure 2 is a detail sectional view of certain of the parts shown in Figure 1,

Figure 3 is a plan of a modification of the construction shown in Figure 1,

Figure 4 is an elevation of the modification shown in Fig. 3.

Figure 5 is a sectional plan of another form of display mechanism according to the invention. This view is a section on the line 5—5 of Fig. 6,

Figure 6 is a section on the line 6—6 of Fig. 5,

Figure 7 is a perspective view of the construction shown in Figures 5 and 6,

Figure 8 is a wiring diagram,

Figure 9 is a perspective view of a detail embodied in the construction shown in Figures 5–7, and

Figure 10 is an edge view of the part shown in Figure 9.

Like reference numerals indicate like parts throughout the drawings.

Referring firstly to Figures 1 and 2 of the drawings, a horizontal rectangular platform 20 measuring say 6 inches square and made of light-weight material, for example the material sold under the registered trademark Bakelite, is supported at its four corners by upstanding spring-steel posts 21 which may conveniently be made of lengths of piano wire. Five mm. thickness is suitable if the effective length of the posts 21 is 4 inches or thereabouts. This platform 20 is the aforesaid oscillatory supporting member for the exhibit and the parts 21 are arranged in an annulus about its axis of oscillation, which is vertical. At the bottom, the four posts 21 are fixed to a heavy cast-iron base 22. Two electro-magnets are secured to standards 220 carried by the base 22. Each electro-magnet comprises a coil 23 and a U-shaped core having two legs 24 and 25 whereof the leg 24 reaches through the inside of the coil 23 and the leg 25 lies outside the latter. The electro-magnets co-operate with laminated iron armatures 26 secured to the platform 20 by brackets 27, in such a manner that an electric current fed to the electro-magnets will result in magnetic attraction rotating

the platform 20 slightly around its vertical axis. An inverted glass tumbler 28 is placed centrally upon the platform 20 and on top of the tumbler is placed the primary exhibit 29 to be displayed. This may be a relatively heavy object. For instance, it may be a squat cylindrical box placed with its cylindrical wall resting upon the tumbler 28 which may have a concave end to receive it. The arrangement is such that the friction is greater between the platform 20 and the tumbler 28 than between the tumbler 28 and the said exhibit 29. An intermittent direct current, which may be obtained by half-wave rectification of alternating current from the public mains, is passed through the coils 23 of the electro-magnets. Due to magnetic attraction between the electro-magnet cores 24, 25 and the armatures 26, the platform 20 will rotate slightly in say the clockwise direction and the exhibit 29 will partially follow this clockwise movement. During this movement the spring posts 21 will be flexed. At the end of the power part-cycle, the magnetic attraction ceases and the spring posts 21 will rotate the platform 20 in the anti-clockwise direction. If this anti-clockwise movement is faster than the clockwise movement, the exhibit 29 is prevented by its inertia from following the platform 20 in its anti-clockwise movement to the same angular extent as it followed the clockwise movement. During one complete oscillatory cycle, therefore, the exhibit 29 will have rotated slightly in a clockwise direction and this will continue to happen. Due to the frequency of the impulses being of the order of 50 to 60 per second, the exhibit 29 will rotate perceptibly, and it will seem that it is rotating steadily in a clockwise direction. Throughout this rotation the tumbler 28 will oscillate with the platform but will appear to be stationary. An observer will find it difficult or impossible to discover the manner in which the rotary motion is imparted to the exhibit 29, particularly if the platform 20 and the associated spring posts 21 and electro-magnets are encased and out of view. If the tumbler 28 is transparent it will apparently be obvious to the observer that that there is no shaft or like driving member connecting the exhibit 29 with mechanism below.

The rotary movement of the exhibit 29 may be promoted by so arranging the spring posts 21 at an angle to the vertical, as shown in Figures 3 and 4, that during the slower movement of the platform 20, the latter will rise slightly (i. e. move towards the exhibit 29) and during the faster movement will fall slightly thus appropriately varying the friction between the sliding surfaces. In Figure 4, the full lines show the posts 21 before they are bent due to the magnetic impulse, and the chain lines show the positions occupied by the posts at the extremity of their movement under the said impulse.

In some circumstances, it is convenient, as shown in Figures 1 and 2, to interpose a sheet 30 of canvas or similar material between the tumbler 28 and the platform 20, this sheet 30 being draped around and hiding the spring-steel posts 21 and the magnets and armatures. In other circumstances the tumbler 28, or a part substituted therefore, may be fixed to the platform 20. When the sheet 30 is employed, it is advantageous, as shown in Figure 2, to secure to the platform 20 a small disc 31 of such a diameter as to raise the sheet 30 slightly inside the mouth of the tumbler 28. This will tend to increase the friction between the sheet 30 and the tumbler 28 and also prevent the latter from lateral displacement.

Referring now to Figures 5–10, the oscillatory supporting member for the exhibit is constituted by two sheets 32, 33 of lightweight material which may be similar to the material of which the aforesaid platform 20 is made. These sheets are held in parallel spaced relation by bolts 34 and have between them a central spacing block 35 and the armatures 26 of the electro-magnets, which armatures are secured to the sheets 32, 33. On the upper face of the sheet 32 there is secured, by blocks 36 a spring-steel wire 37, and on the lower face of the sheet 33 there is secured, by blocks 38 a similar wire 39. These wires 37 and 39 are horizontal and, as shown in Figure 5, intersect the axis of oscillation of the sheets 32 and 33, which axis is vertical. The assembly thus far described is housed in a metal frame 40, which provides ledges upon which the ends of the wires 37 and 39 are secured by straps 41. Thus the wires support the sheets and are free to flex during the oscillations of the latter. The electro-magnets 23, 24 and 25 are mounted on the frame 40 by brackets 42. An ornamental cover 43 (see Figure 7) loosely encloses the frame 40 and the parts mounted thereon, except that the upper ends of the bolts reach through this cover to hold in place, and clamp to the oscillatory sheets 32, 33, an open support 44 of channel cross-section which may conveniently be of transparent material. Resting upon the support 44 is a cradle 45 to receive the exhibit 46, the cradle also being preferably of transparent material. This cradle is centred on the support 44 by a pin (see Figure 6) and is intended to rotate about the axis of the pin. Around this pin, and between the support 44 and the cradle 45, there is placed a washer 47 (see Figures 9 and 10). This washer has a textile pile 48 which is obliquely circularly arranged about the axis of oscillation and the fibres are so directed as to offer greater friction during the slower movements of the oscillating parts than during the faster movements. That is to say they offer greater friction to movements caused by the electro-magnets than to return movements caused by the wires 37 and 39. A rectifier is shown at 49. This may be electrically connected as shown in Figure 8.

The construction shown in Figures 5–10 operates in a manner similar to that in which the construction shown in Figures 1 and 2 operates, the support 44 partaking of the oscillations of the sheets 32 and 33 and the cradle 45 and exhibit 46 appearing to rotate continuously in a single direction.

It is to be understood that the invention is not restricted to the precise constructional details set forth.

I claim:

1. Display mechanism for rotating an exhibit, said mechanism comprising an exhibit-supporting member on which the exhibit freely rests, means for imparting oscillations to the supporting member around substantially the same axis as that around which the exhibit is to rotate and solely in planes normal to said axis, said oscillations being of such small amplitude and high frequency as to be invisible to the naked eye and having a greater angular speed in one direction of the oscillatory movement than in the other so that during the slower of the two movements of the supporting member the exhibit is caused to follow the movement of said member at least in part, whereas during the faster of the two movements, the inertia of the exhibit prevents it from following the movement of the supporting member to the same angular extent as during the slower movement, the oscillation-imparting means including an electro-magnet for moving the supporting member in one direction at relatively low speed, means for intermittently energizing said magnet, and resilient means opposing the magnet-generated movements of the said member and operative to effect the reverse movements of the member at a relatively high speed when the magnet is de-energized.

2. Display mechanism according to claim 1, wherein the supporting member is mounted on and is supported by the resilient means.

3. Display mechanism according to claim 2, wherein the resilient mounting for the supporting member takes the form of spring steel wires which flex to permit the slower of the two movements of the supporting member by the electro-magnetic impulses, and which themselves impart the faster of the two movements by returning to their unflexed condition in the intervals between the said impulses.

4. Display mechanism according to claim 3, wherein the said spring steel wires take the form of upstanding

posts arranged in an annulus about the axis of oscillation of the supporting member which axis is substantially vertical.

5. Display mechanism according to claim 3, wherein the said spring steel wires lie in substantially horizontal planes and intersect the axis of oscillation of the supporting member, which axis is substantially vertical.

6. Display mechanism according to claim 3, wherein the said spring steel wires take the form of upstanding posts offset radially from the axis of oscillation of the supporting member, which axis is substantially vertical, and wherein further the said posts are disposed at an angle to the vertical so that during the slower of the two movements of the supporting member the said member is caused to rise slightly and during the faster of the two movements the supporting member is caused to fall slightly.



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