

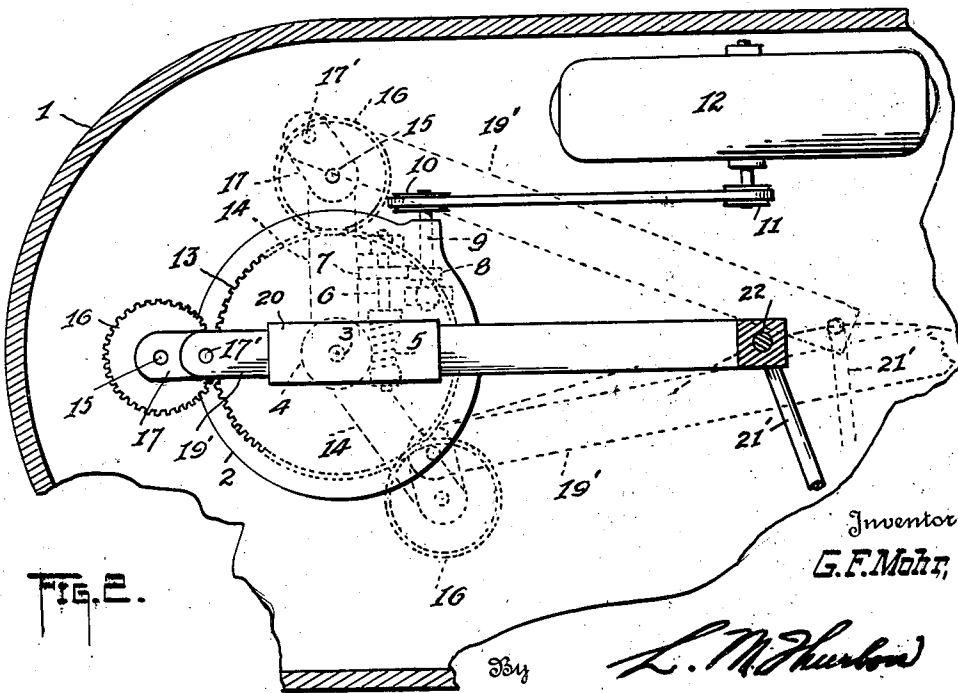
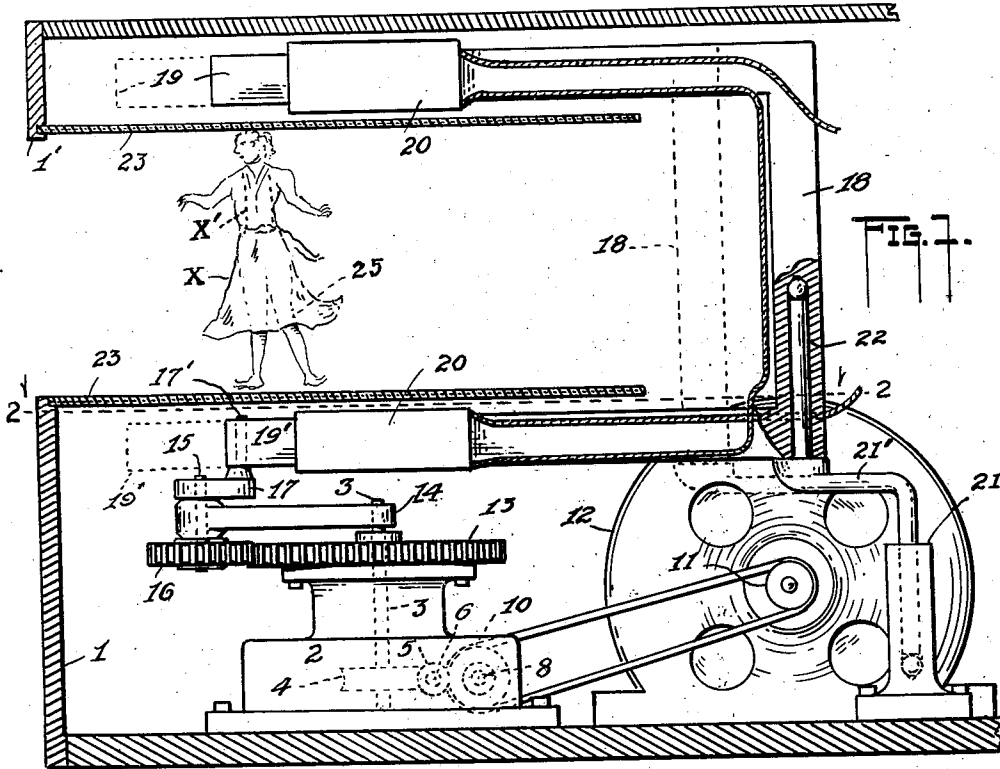
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G. F. MOHR
ANIMATED DISPLAY DEVICE

2,471,002

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2 Sheets-Sheet 1



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2 Sheets-Sheet 2

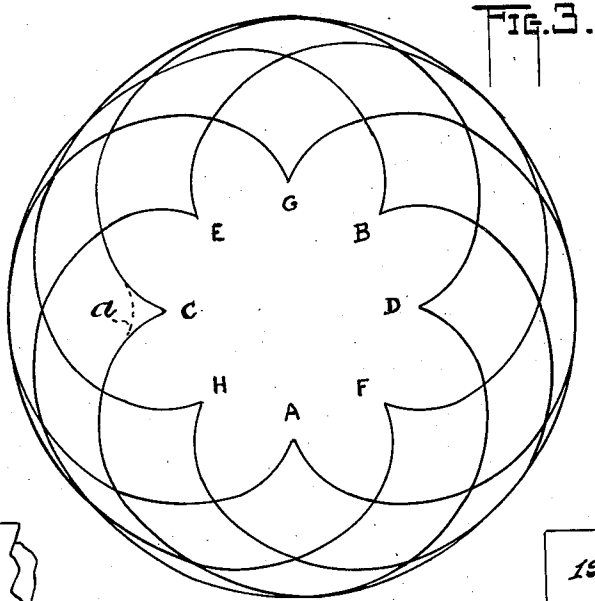


FIG. 3.

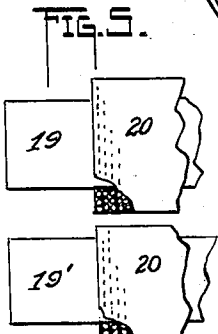


FIG. 5.

FIG. 5^a.

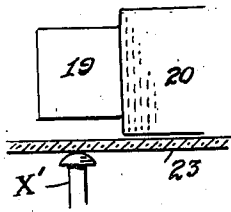


FIG. 6.

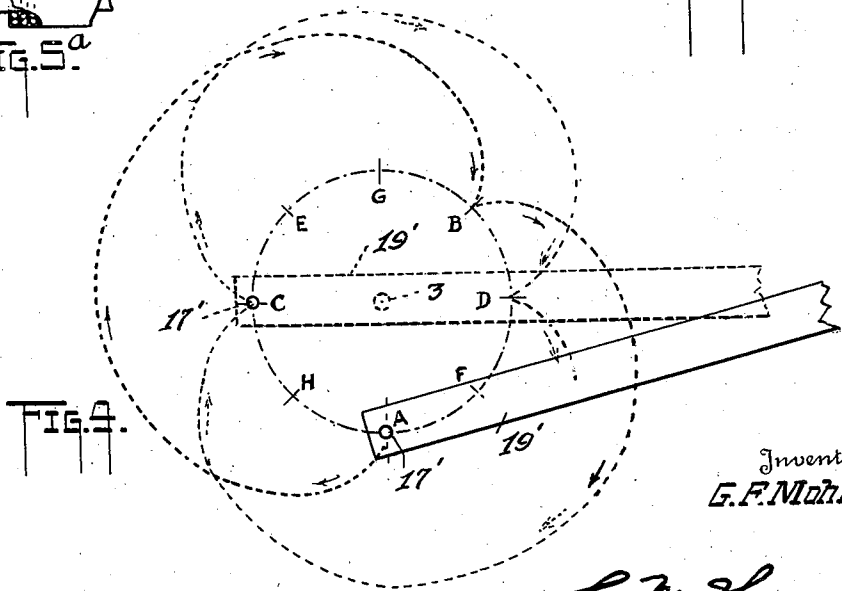


FIG. 4.

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ANIMATED DISPLAY DEVICE

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5 Claims. (Cl. 46-45)

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This invention relates to an animated display device for amusement purposes, as well as for an attraction, in windows where articles are displayed for sale.

The main object of the invention is to provide a device so arranged as to excite curiosity by reason of the activities of a moving figure as presented to the eye of an observer where no apparent controlling mechanism is visible.

Still another object is that by a peculiarly arranged driving mechanism the magnet will be given an erratic path of travel so that the armature-figure will have substantially, a like erratic movement in its travel.

Other objects and advantages will appear in the following specification aided by the accompanying drawings forming part hereof, wherein:

Figure 1 is an elevation in longitudinal section of part of a containing case or housing showing the mechanism of the present invention also in elevation.

Figure 2 is a plan of the same in horizontal section taken on line 2-2, Figure 1, and wherein certain parts are shown in different positions as they would appear during action.

Figure 3 is a plan showing or tracing of the path of movement of the poles of a magnet forming part of the mechanism illustrated.

Figure 4 is a diagram of certain parts of the mechanism shown in Figure 2 slightly enlarged, and wherein but a partial tracing of the path of the diagram of Figure 3 is included for a clear understanding of said diagram.

Figures 5 and 5^a are elevations of the extremities of the two legs of an electromagnet of Figure 1, wherein two windings of wire are shown, one having more ampere turns than the other.

Figure 6 is an elevation of an extremity of a leg of the magnet of Figure 1 and part of an armature adjacent the same.

In the figures 1 designates, in general, a portion of a housing wherein is contained the mechanism of the invention, said housing including an upper cavities portion 1' spaced from the main lower body-portion for a purpose to appear presently. In position in the said lower body-portion is erected a gear-case 2 wherein is an erected shaft 3 whose lower end has affixed thereto a worm-wheel 4. In mesh with the worm-wheel is a worm 5 fixed on a shaft 6, which latter carries a gear 7 meshing with which is a pinion 8 on a shaft 9, and a pulley 10 on said shaft 9 is driven by a pulley 11 of a motor 12. It is understood, however, that other ways of providing a reduction gear arrangement may be employed.

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Affixed to the gear case 2 at its top, in this instance, is a gear 13, the shaft 3 extending through and beyond it and free to turn therein. The projecting end of the said shaft 3 has affixed thereto one end of an arm 14 at the other end of which is a shaft 15 free to turn therein, one end of the shaft 15 having secured thereon a pinion 16 meshing with the gear 13, its other end having secured thereto an arm 17 carrying the lower leg of an electro-magnet 18 each of whose legs 19, 19' is provided with windings of wire 20, the windings of the upper leg 19, for a purpose to be made known, having more ampere turns than that on the leg 19'.

It is now observed that the said upper leg 19' of the magnet lies within the spaced apart portion 1' of the housing and is free to swing therein in a horizontal plane as suggested in Figure 2 in broken lines.

Mounted in a convenient position is a supporting bearing 21, Figure 1, to receive a cranked member 21' the free upright extension of which enters a bore 22 in the yoke-portion of the magnet, in this instance, as a support for the latter and to permit a free swing thereof horizontally and in a lateral direction, the free extremity of the leg 19' of the magnet being free to turn upon and moved by a wrist-pin 17' of said arm 17. However, equivalent means may be used for obtaining the named movement of the yoke portion.

Mounted in fixed position with respect to the housing 1, 1' beneath the upper magnet-leg 19, and above the lower magnet-leg 19' is a member 23 in the form of a plate of non-magnetic material such as aluminum, glass, or other suitable material. The upper plate 23, especially, for the purpose of the invention, has a wholly smooth surface for its lower side, and said plate may lie quite close to the adjacent magnet-leg. The lower plate may be a mirror as representing a dancing floor, or a skating ice-sheet, for example, as an attractive setting.

Any figure X, such as that representing a human being, for example, is insertable into the space between the plates 23, being slightly less in overall height, Figure 1, than the space measured between said plates.

Said figure X is, in effect, an armature in that a magnetically attracted member suggested in broken lines X' in Figure 1, is used, see also Figure 6, this member weighting the figure. And said member may be bifurcated to provide for a slight lateral extension, forming the leg 25 of said figure, for example, to provide for a slight unbalance of the said figure, the main portion of the arma-

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ture having a substantially upright position as shown.

In a study of Figure 2 it will be observed that the motor 12 will, through the gearing described, impart rotation to the shaft 3, in the present instance in a clockwise direction as agreeing with further description herein.

This motion being imparted, the long arm 14 will carry the pinion 16 around the stationary gear wheel 13, in mesh therewith, while rotation of the shorter arm 17 will also occur as it turns with the shaft 15, the said arm 17 and said pinion rotating as a unit.

The purpose herein is to impart a gyrating movement to the extremities of the magnet legs, between which the figure X is placed, said extremities having an orbit about the center of the gear 13. That such a movement may result the arm 17 is employed on the arm 14, or any other expedient that will produce the effect desired. During rotation of the pinion 16 around the gear 13 the arm 17 produces the required movement by alternately swinging with the attached leg 19' toward and away from the center of the said gear 13 as said arm turns with, and with respect to arm 14, this being made clear in a study of Figure 4 wherein the tracing of the path of travel is partially shown in broken lines, and describing what may be termed, perhaps epicycloids.

In said Figure 4 the position indicated at A may be taken as the starting point of the traced path, the heavy broken lines therefrom leading to the point indicated at B, thence moving onward from the latter.

It is to be remembered, in what now follows, that the extremities of the legs of the magnet are those portions that take the various positions A to H. The straight broken lines in Figure 4 indicate the position the leg 19' of Figures 1 and 2 at point A and at this juncture, also, it is to be stated that the teeth of the pinion 16 and the gear 13 are in the order of twenty to thirty-two and thus the full pattern shown in both Figures 3, or that portion in Figure 4 is produced, it being noted that the points A to H in Figure 4 correspond with the same points in said Figure 3.

Now, as a starting position for travel of the leg 19' of the magnet, we may assume the position A, for example. Said leg will move therefrom to B, and successively to the other positions indicated. Having the gear ratio in mind, the leg in its cycle around the central position at 3 has an imperceptible gain in distance travel in each sweep between the positions identified by the letters. After a full cycle the travel-path traced by the leg, that member in further gyrations in a second cycle begins to overlap its first tracings so that the meeting point of 17' with the circle A, B, C, etc., will then be in advance of any given letter position and thus lie between letter positions first touched. For example, if the leg position is between B and C the circle will be met beyond, and nearest B. In a further or next swing the circle will be met between C and D, and nearest C. In each cycle the gain continues, and new tracings and new positions on the letter-circle is the result, until after a long period, incidentally, the movements of the point at 17' will finally merge into the paths first traced from A.

Neither the intermediate positions described, nor the new paths of travel have been indicated on the drawing since to do so would unduly confuse and complicate the same, one full, or first cycle, only, having been shown.

The result of the foregoing described actions

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is reflected in the movements of the armature-figure as will appear later.

Naturally any change in gear ratio would set a new pattern of travel in that either a less number of positions A—H or a greater number of such positions would result.

This has all been described as leading to given desired results now to appear.

When placing the armature-figure X between the plates 23 in a more or less upright position, with the electric current flowing through the coils 20, said figure is at once attracted by the legs 19, 19', but more strongly by the upper leg 19 due to more ampere turns in the coil thereon, with the result that the rounded top of the head of said figure is held against the plate 23 above it.

As the magnet begins its gyrations according to the described mechanism, including the cranked guiding member 21, or an equivalent manner of mounting, the figure X which has been lifted free of the lower plate 23 moves along and against the surface of the upper plate 23 and follows fairly closely the said gyrations. The top of the figures is, in fact, the extremity of the armature and which is spherically curved and fairly smooth for the purpose of reducing friction in respect to said upper plate 23 from which plate the figure is suspended due to magnetic attraction.

The figure in following around the long sweeping outer curves traced by the magnet has a slight momentum due to the weight of the armature portion. When, however, the path of magnet travel moves through shorter curves to any one of the positions A—H the figure hesitates and due to the slight unbalance thereof carried by the bifurcation mentioned above, and any slight friction, perhaps between the armature and said upper plate, is set into a whirl before starting along a further sweep on another longer curve. That is to say, the figure, due to such momentum, may leave a long curve of the orbit as suggested by the broken line *a*, Figure 4, when the magnet suddenly moves into a shorter curve at any one of the positions A to H and thus said figure will reach the long curve next to be followed by the magnet as that member leaves any such position that the figure may reach, magnetic influence still controlling the figure in its transition. This, then, is one purpose of the structure. If the figure were to move through a more or less unbroken circular orbit there would be little chance of the whirling or spinning motion since the said figure would constantly remain in a long sweeping endless curve, whereas in the present instance the whirling movements take place at intervals throughout a generally circular travel, besides constantly advancing to new advanced positions in that path due to the gear ratio as previously explained.

While in part of the described circuit of travel the figure will whirl at given positions, in a further travel, in gaining progressively, it whirls at points in advance of the said given positions, and thus the whirls occur at, in this instance, eight different positions in one cycle of travel around the position 3. Therefore, monotony of figure action is not presented to an observer.

This is by reason of course of the employment of the two arms 14 and 17, as stated, or an equivalent arrangement, together with the constant travel-gain of the pinion 16, as already noted.

In this connection it must be understood that due to the constant change in the position of the pole 19 in each cycle of travel the figure must whirl at an infinite number of points in its orbit.

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The action as of a dancer, or perhaps a skater, is thus placed before the observer in a manner to attract and hold attention.

Naturally, the entire mechanism is screened from view by the housing 1,1', including the legs of the magnet, so that the entire action only of the moving figure is observable.

The figure may not always, perhaps, actually move fully up to the position A—H in its travel but hesitate slightly distant from any one of those positions until the magnet extremities have moved toward and away from such position, though due to the attraction for the armature the figure is still under control. Thus the figure would travel in a more or less circular path while still having its several whirling motions near the positions named.

While an arrangement is shown as described that serves the end attained it is understood that other structures may be employed that will lie within the meaning of the inventive act and the claims to follow.

As an instance, while the magnet of U-form has been shown and described, a magnet of rectangular form or straight throughout, may perhaps, be used, such, for example, as using the leg 19 only, or without the leg 19', and thus perhaps, serve the purpose, when given such movements as described herein in respect to the latter. However, the control of the armature-figure might not, perhaps, be quite as effective as that served by the said U-form where the opposed magnetic fields are employed.

What is claimed is:

1. A device of the nature described including in its construction an electro U-shaped magnet mounted to swing, driving mechanism in operative engagement therewith including a rotatable member mounted for orbital movement about a common point in a horizontal plane, and itself rotatable, a part fixed with respect to said member and rotatable therewith, the said magnet being pivotally connected to said part distant from the axis of rotation of said member, the opposite poles of the magnet lying in a vertical plane, an armature-figure interposed between said poles, a magnet coil winding on each pole of the magnet, the number of ampere turns of the windings on the upper pole being greater than the number of turns on the lower pole, thus tending to counteract the weight of the armature-figure by a predominating magnetic attraction in said upper pole, and means for maintaining said armature-figure in spaced relation to the upper of the two poles in opposition to the magnetic attraction of that pole for the armature-figure.

2. The invention according to claim 1 wherein the armature-figure is spaced from the lower pole of said magnet.

3. A device of the nature described including in its construction a mounted fixed gear, an arm swingable about the axis thereof, means to ro-

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tate the arm, a pinion carried by the arm, the same being rotatable with the pinion, a mounted electro U-magnet erected with its poles one above the other in a substantially vertical plane and free to swing in a horizontal plane, the lower pole thereof being operatively engaged with said arm distant from the axis of the same, an armature-figure beneath the upper of the two poles, and a fixed member interposed between said upper pole and said armature-figure and paralleling the plane of movement of the former and spaced therefrom, said figure being held at one end against the member during movements of the magnet, the other end of said figure being spaced from the lower magnet-pole, a magnet coil winding on each pole of the magnet, the number of ampere turns on the upper pole being greater than the number of turns on the lower pole thus tending to counteract the weight of the armature-figure by a predominating magnetic attraction in said upper pole.

4. A device of the nature described including in its construction a mounted electro U-magnet, a mounted fixed gear, an arm swingable about the axis of said gear, a pinion carried by the arm, the same being rotatable with the pinion, a pole of the magnet being pivotally connected with respect to the pinion at a position distant from the axis of rotation thereof, an armature-figure adapted for erection between the poles of the magnet, the upper pole having more ampere turns thereon than on the lower pole, and means to maintain the armature-figure in spaced relation to said upper pole and adapted to guide the same during swinging movements of said magnet while being influenced by the latter.

5. A device of the nature described including in its construction a U-shaped magnet mounted to swing, its poles being horizontally extended and lying in a vertical plane, driving mechanism in operative engagement with said magnet adapted to swing the same in a horizontal plane, and adapted also to impart to its poles epicycloidal movements, an armature-figure interposed between the poles, a member interposed between the upper of the two poles and said figure adapted to receive the latter against it, said armature figure depending toward the lower of the two poles, the relation of magnetic attraction of the poles in respect to said figure being such that the greatest attraction is at the said upper of the two poles.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,277,371	Boyle et al.	Sept. 3, 1918
1,318,071	Goodman	Oct. 7, 1919
2,192,476	Marvin	Mar. 5, 1940