

July 2, 1968

D. A. BROWN ET AL

3,390,460

MARKING DEVICE

Filed Aug. 2, 1966

2 Sheets-Sheet 1

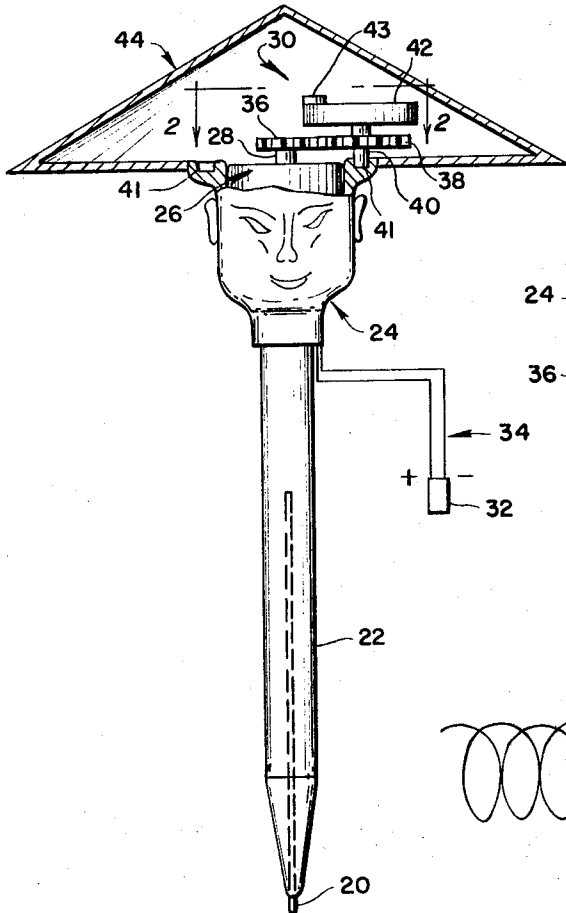


FIG. 1

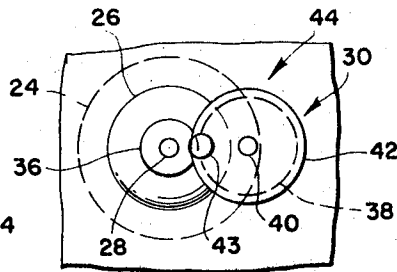


FIG. 2

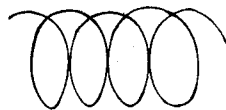


FIG. 3

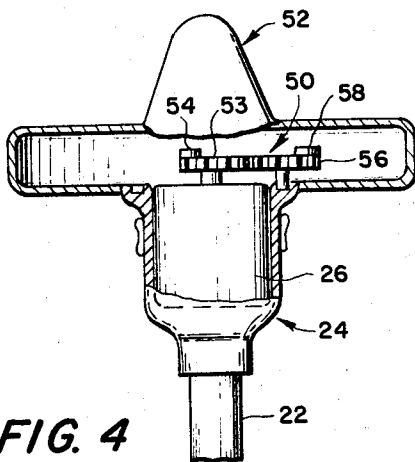


FIG. 4



FIG. 5

INVENTORS
DAVID A. BROWN
BERNARD S. BENSON

BY *Burns, Doane, Benedict, Seussler & Mathis*

ATTORNEYS

July 2, 1968

D. A. BROWN ET AL

3,390,460

MARKING DEVICE

Filed Aug. 2, 1966

2 Sheets-Sheet 2

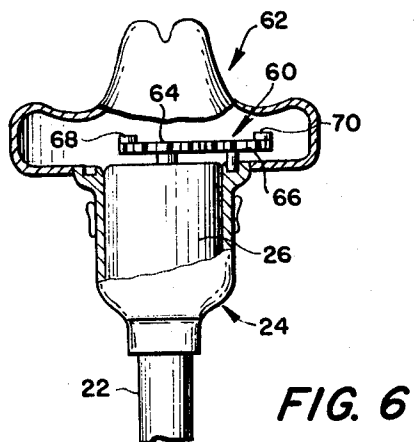


FIG. 6

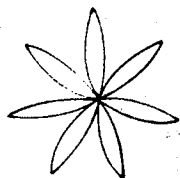


FIG. 7

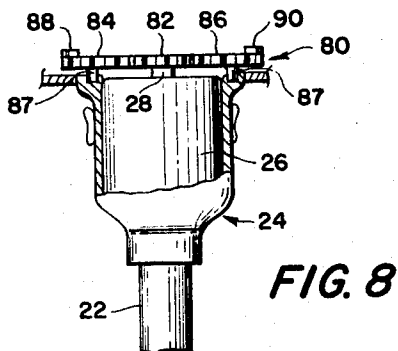


FIG. 8

FIG. 9

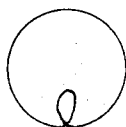


FIG. 10

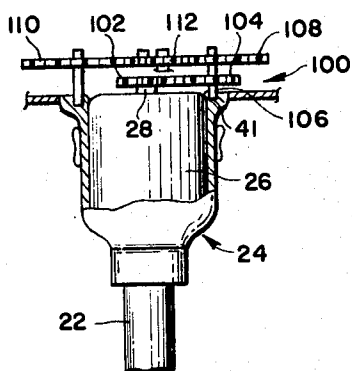


FIG. 11

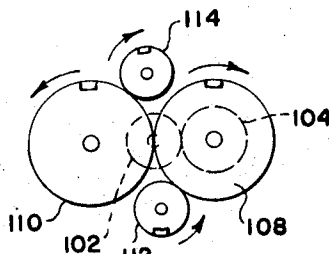


FIG. 12

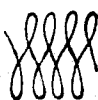


FIG. 13

INVENTORS
DAVID A. BROWN
BERNARD S. BENSON

BY *Burns, Doane, Benedict, Suecker & Mathis*

ATTORNEYS

1

3,390,460

MARKING DEVICE

David A. Brown and Bernard S. Benson, both of Chateau de Chaban, Saint-Leon-sur-Vezere, Dordogne, France Vezere, France

Filed Aug. 2, 1966, Ser. No. 569,681

5 Claims. (Cl. 33—27)

ABSTRACT OF THE DISCLOSURE

A marking device adapted to be grasped by a user's fingers in a usual writing position thereof which includes a body adapted to be contacted by the user's fingers with the fingers providing a fulcrum for limited motion of opposite ends of the body in planes perpendicular to the longitudinal axis of the body. The device further includes a marking surface secured to one end of the body and electric motor means fixedly connected to the other end of the body. Eccentric mass means rotatably connected with the body is operatively connected to the motor means. The motor means rotates the eccentric mass means to produce rotating out of balance forces acting on the body to cause pivotal motion thereof about the fulcrum provided by the user's fingers, thereby causing movement of the marking surface in one of the planes perpendicular to the body axis.

The present invention relates to marking devices of the type adapted to be held in the user's hand and to automatically apply decorative markings to a surface.

Heretofore hand-guided, motor-oscillated marking devices for applying decorative markings to a surface have been known. One type of such devices comprises a marking element pivotally supported within an elongated body. An electrically-powered motor is fixedly mounted on the upper end of the body and is drivingly connected to the marking element through a crank or eccentric drive. Upon rotation of the motor, the marking element is eccentrically driven and caused to oscillate within its pivotal support in the desired decorative pattern. To adjust the amplitude of oscillation, the pivotal support of the marking element on the body may be adjusted longitudinally thereof. While such devices are satisfactory in many respects, they tend to be bulky because of the manner in which the marking element is supported and eccentrically driven. Further, the range of decorative shapes or patterns that may be applied automatically through the use of such marking devices is somewhat restricted.

It is an object of this invention to provide a marking device of the type described which minimizes or circumvents the problems heretofore noted.

More specifically, it is an object of this invention to provide a marking device of the type described of a simplified construction which eliminates the necessity of pivotally supporting the marking element within the body of the device.

It is a further object of this invention to provide a marking device of the type described that, through simple modification, is adapted to impart a broad range of complex decorative shapes to a surface.

In achieving these and other objects as will become apparent hereinafter, the present invention provides a marking device adapted to be held in the user's hand, the device including a body having a longitudinal axis and including first and second ends. A marking element is fixedly positioned on the first end of the body and motor means is fixedly positioned on the body adjacent the second end. An eccentric mass means is operatively connected to the motor means whereby rotation of the eccentric mass means by the motor means results in oscillation of

2

the marking element in a plane perpendicular to the longitudinal axis of the body and within the hand of the user.

To facilitate applying complex decorative shapes to a surface, a marking device according to the present invention may be conveniently modified by the provision of plural eccentric masses whereby rotation of the plural eccentric masses by the motor means results in a complex oscillation of the marking element.

A further understanding of the present invention and the various embodiments thereof may be gained by reference to the following specification and drawings, forming a part thereof, wherein:

FIGURE 1 is a perspective view, partially in cross-section, of a marking device according to the present invention, wherein a single eccentric mass is provided;

FIGURE 2 is a schematic, top view of the eccentric mass and the driving arrangement shown in the embodiment of FIGURE 1;

FIGURE 3 is a schematic view showing a shape of decorative marking that may be applied to a surface as the user's hand is translated across the surface;

FIGURE 4 is a fragmentary, cross-sectional view of a second embodiment of a marking device according to the present invention, wherein a modified eccentric mass arrangement is provided;

FIGURE 5 is a schematic view showing the shape of a decorative marking that may be applied to a surface through utilization of the embodiment shown in FIGURE 4;

FIGURE 6 is a fragmentary, cross-sectional view of a third embodiment of a marking device according to the present invention wherein still another eccentric mass arrangement is provided;

FIGURE 7 is a schematic view showing the shape of a decorative marking that may be applied to a surface through the utilization of the embodiment shown in FIGURE 6;

FIGURE 8 is a fragmentary, cross-sectional view of a fourth embodiment of a marking device according to the present invention wherein a fourth arrangement of eccentric masses is included;

FIGURE 9 is a schematic view showing a decorative marking that may be applied to a surface through utilization of the embodiment shown in FIGURE 8;

FIGURE 10 is a schematic view of a decorative marking that may be applied to a surface through utilization of a slightly modified form of the embodiment shown in FIGURE 7;

FIGURE 11 is a fragmentary, cross-sectional view of a fifth embodiment of a marking device according to the present invention;

FIGURE 12 is a schematic, top view showing the orientation of the eccentric masses and drive therefor included in the embodiment shown in FIGURE 11; and

FIGURE 13 is a schematic view showing a decorative marking which may be applied to a surface through utilization of the embodiment shown in FIGURES 11 and 12.

Referring in more detail to FIGURE 1 of the drawings, a marking device according to the present invention generally comprises a pen including a marking element 20 which, in the preferred embodiment, is a conventional ball point pen cartridge including an ink reservoir having a ball point writing surface on the lower end thereof. The marking element 20 is fixedly positioned within, and projects from, a cylindrical pen body 22. Fixedly positioned on the upper end of the pen body 22 is a cylindrical motor housing 24 in which is fixed an electric motor 26 having a drive shaft 28 projecting from the upper end thereof. The exterior of the motor housing 24 may be

3

formed in the shape of a comic human head. Drivably connected to the drive shaft 28 is an eccentric mass assembly 30. A dry-cell battery 32, or any suitable source of AC or DC current, may be electrically connected to the motor 26 by leads 34 to rotate the motor and any suitable switch means may be provided to initiate or interrupt motor operation. Although the marking device is shown as comprising a ball point pen cartridge, it should be emphasized that conventional felt-tip pens are equally applicable to the present invention.

In the embodiment shown in FIGURE 1, the eccentric mass assembly 30 comprises a drive gear 36 fixedly but removably connected, as by splines or the like, to the upper end of the drive shaft 28. A driven gear 38, having an increased number of teeth relative to the drive gear 36, engages the drive gear 36 and is supported on the upper end of the motor housing 24 by a support shaft 40 received in one of a plurality of bores 41 positioned about the periphery of the housing. The support shaft 40 projects through the driven gear 38 and fixedly receives an eccentric mass 42 (FIG. 2) which may take the form of a greatly unbalanced fly wheel having an eccentric weight 43 at one point about its periphery. An eccentric mass assembly housing or cover 44 is removably positioned on the upper end of the motor housing 24 so as to enclose the eccentric mass assembly 30 and prohibit accidental contact therewith by the user's hands. In the form of the present invention shown in FIGURE 1, the eccentric mass housing 44 may be in the shape of a generally conical, Chinese coolie hat by way of adding attractiveness to the device. Of course, if a reduction drive is not desired, the eccentric mass 42, or any simplified form thereof, may be mounted directly upon the drive shaft 28. Although the battery 32 is shown as being externally mounted, it should be appreciated that this battery may be positioned within the housing 24 or cover 44.

To operate the device the user grasps the pen body in the usual manner between the longitudinal ends thereof. Upon actuation of the motor 26, the eccentric element 42 is caused to rotate about an axis parallel to, but spaced from, the longitudinal axis of the pen. Of course, if the eccentric mass 42 is mounted directly on the drive shaft 28, the axis of rotation coincides with the axis of this shaft. Because of this eccentric rotation, the upper end of the pen is caused to swing in a circle and wobble within the fingers of the user thereby causing the marking element to impart a decorative, generally circular marking to a surface. If the pen body is held relatively firmly within the user's fingers and the user's hand translated across the surface, a decorative marking similar to that shown in FIGURE 3 will be formed. It should be noted that to change the amplitude of oscillation, it is merely necessary for the user to grasp the pen body at a higher or lower point or with varying degrees of firmness of grip. Further, it has been found that the speed of oscillation or rotation of the overall pen may be varied by merely varying the firmness of the grip on the pen by the user's fingers.

By this arrangement, the necessity, as in other devices of this type, of providing a pivotal support between a pen body and a marking element is eliminated, this pivotal support function being performed by the user's fingers. Not only is the construction of the instant marking device simplified but, when utilized as a toy, the device is particularly entertaining because the user feels the vibrating or wobbling sensation imparted to his fingers.

Referring to FIGURE 4, a second embodiment of the present invention is shown wherein the eccentric mass assembly 30 and housing 44 have been replaced by a second eccentric mass assembly 50 and a second eccentric mass housing 52. The housing 52 may take the form of a Mexican sombrero slidably received on the upper end of the motor housing 24. The eccentric mass 50 comprises a drive gear 53, suitably mounted on the motor

4

drive shaft 28, the drive gear 53 having an eccentric weight 54 at one point on its periphery. The drive gear 53 drivably engages a driven gear 56, which also has an eccentric weight 58 at one point on its periphery. In this embodiment, the driven gear 56 has an eccentric weight and a number of teeth identical to that of the driving gear 53, being rotatably supported on a support shaft 60 rotatably received in the aperture or bore 41. Assuming the eccentric weights 54 and 58 are initially positioned to oppose one another, a decorative pattern as shown in FIGURE 5 may be formed by translation of the device across a surface. Of course, the driven gear 56 may be removed and this embodiment may be utilized to form a decorative pattern generally similar to that shown in FIGURE 3.

In the embodiment of the present invention shown in FIGURE 6, still another eccentric mass assembly 60 and housing 62 is provided. The housing 62 may be in the form of a cowboy hat. The eccentric mass assembly 60 is similar to the assembly 50 shown in FIGURE 4 but includes driving and driven gears, 64, 66 having an unequal number of gear teeth. The gears 64, 66 are provided with eccentric weights 68, 70, respectively, of an equal magnitude. Assuming the pen is held relatively stationary, a decorative pattern similar to that shown in FIGURE 7 may be formed. It should be noted that the number of lobes of the pattern varies in accordance with the gear ratio between gears 64 and 66, and that the greater the disparity between the weights 68, 70, the more closely each lobe will approach a circle. However, if the line formed is to pass through the center of the figure during each cycle, the eccentric weights must be equal.

Referring to FIGURE 8, a third embodiment of the present invention is shown wherein an eccentric mass assembly 80 includes a drive gear 82 interposed, in driving relation, between a pair of relatively larger eccentric gears 84 and 86 supported on shafts 87 in bores 41. In this embodiment, the gears 84 and 86 are driven in the same rotary direction and have eccentric weights 88 and 90, respectively, of an equal magnitude. If the pen is held relatively stationary, and one eccentric weight is rotated at twice the speed of the other, this arrangement may be utilized to form a pattern similar to that shown in FIGURE 9. If the weights 88 and 90 are of an equal magnitude and the gears 84 and 86 differ only slightly as to number of teeth, a pattern similar to that shown in FIGURE 10 may be formed.

The embodiment of the present invention shown in FIGURES 11 and 12 includes an eccentric mass assembly 100 comprising four eccentric gears, each with eccentric weights on its periphery. A drive gear 102 positioned on the motor shaft 28 drivably engages a driven gear 104 on a shaft 106 received in a bore 41 in the motor housing 26. Positioned above the driven gear 104 on the shaft 106 is a first eccentric gear 108 of a relatively large diameter. The first eccentric gear 108 drivably engages second eccentric gear 110, of a like diameter and having an eccentric weight of an equal magnitude and a third eccentric gear 112, of a smaller diameter. The second eccentric gear drivably engages a fourth eccentric gear 114 of a like diameter and having an eccentric weight of an equal magnitude as the third eccentric gear 112. The second, third and fourth eccentric gears are supported on the motor housing 26 in a manner similar to the first eccentric gear.

If the pen having eccentric mass assembly 100 is translated across a surface, a decorative pattern similar to that shown in FIGURE 13 may be formed. It should be noted that the relationship between the centrifugal forces generated by the small gears and the large gears determines the fullness of the loops. As will be apparent, many different decorative patterns may be formed by merely altering the drive ratio between, or relative magnitude of the eccentric weights on, the various eccentric gears.

5

It should be noted that the elements of the several embodiments of eccentric mass assemblies heretofore disclosed may be supported or driven in any convenient or suitable manner. For example, it may be desirable to position the pen within an inwardly deflectable collar provided with a rubber grommet, or the like, to contact and pivotally support the pen. By varying the grip exerted by the user's fingers on the collar, the restraining force on the pen exerted through the grommet may be varied to thereby vary oscillation amplitude and speed. Further, while the present invention has been disclosed as exemplified by a pen, it should be clear that any writing or decorative marking tool, such as a felt tip pen or the like, may be substituted as the marking element. Finally, it will be apparent to those skilled in the art that additions, deletions, modifications, substitutions and other changes in the specifically described and illustrated embodiments may be made which will fall within the purview of the appended claims.

Having thus described the invention, we claim:

1. A marking device adapted to be grasped by a user's fingers in a usual writing position thereof, said device including a body having a longitudinal axis, said body adapted to be contacted by the user's fingers with the finger providing a fulcrum for limited motion of opposite ends of said body in parallel planes perpendicular to said longitudinal axis, a marking unit fixedly positioned on one longitudinal end of said body, said marking unit including a marking surface, electric motor means fixedly connected with said body adjacent another longitudinal end thereof, and eccentric mass means rotatably connected with said body and operably connected to said motor means, said motor means rotating said eccentric mass means to produce rotating out of balance forces acting on said body to cause pivotal motion thereof about the fulcrum provided by the user's fingers thereby causing movement of said marking surface in one of said planes perpendicular to said longitudinal axis.

6

2. A marking device according to claim 1 wherein said eccentric mass means comprises a single eccentric mass having an axis of rotation generally parallel to and spaced from said longitudinal axis, and drive means drivingly connecting said mass and said motor means, whereby said eccentric mass during rotation causes said marking surface to move in a uniform circular path.

3. A marking device according to claim 2 wherein said drive means comprises reduction drive gear means.

4. A marking device according to claim 2 wherein said eccentric mass means comprises a plurality of eccentric masses of unequal magnitude, said masses rotatably connected with said body for separate rotation about individual axes of rotation spaced about and parallel to said longitudinal axis, said eccentric masses causing said marking surface to move in one of a plurality of non-circular paths determined by the relative magnitudes and speeds of the various said eccentric masses.

5. A marking device according to claim 4 wherein said marking unit comprises a marking fluid supply chamber, a movable marking element at one end of said chamber, said marking element defining said marking surface, said device further comprising motor housing means fixedly supporting said motor means adjacent the upper end of said cartridge, and eccentric housing means removably positioned on and above said motor housing means and encasing said eccentric mass means.

References Cited

UNITED STATES PATENTS

3,297,003 1/1967 Benson ----- 33—27

FOREIGN PATENTS

13,015 3/10 Denmark.

HARRY N. HAROLAN, *Primary Examiner*.