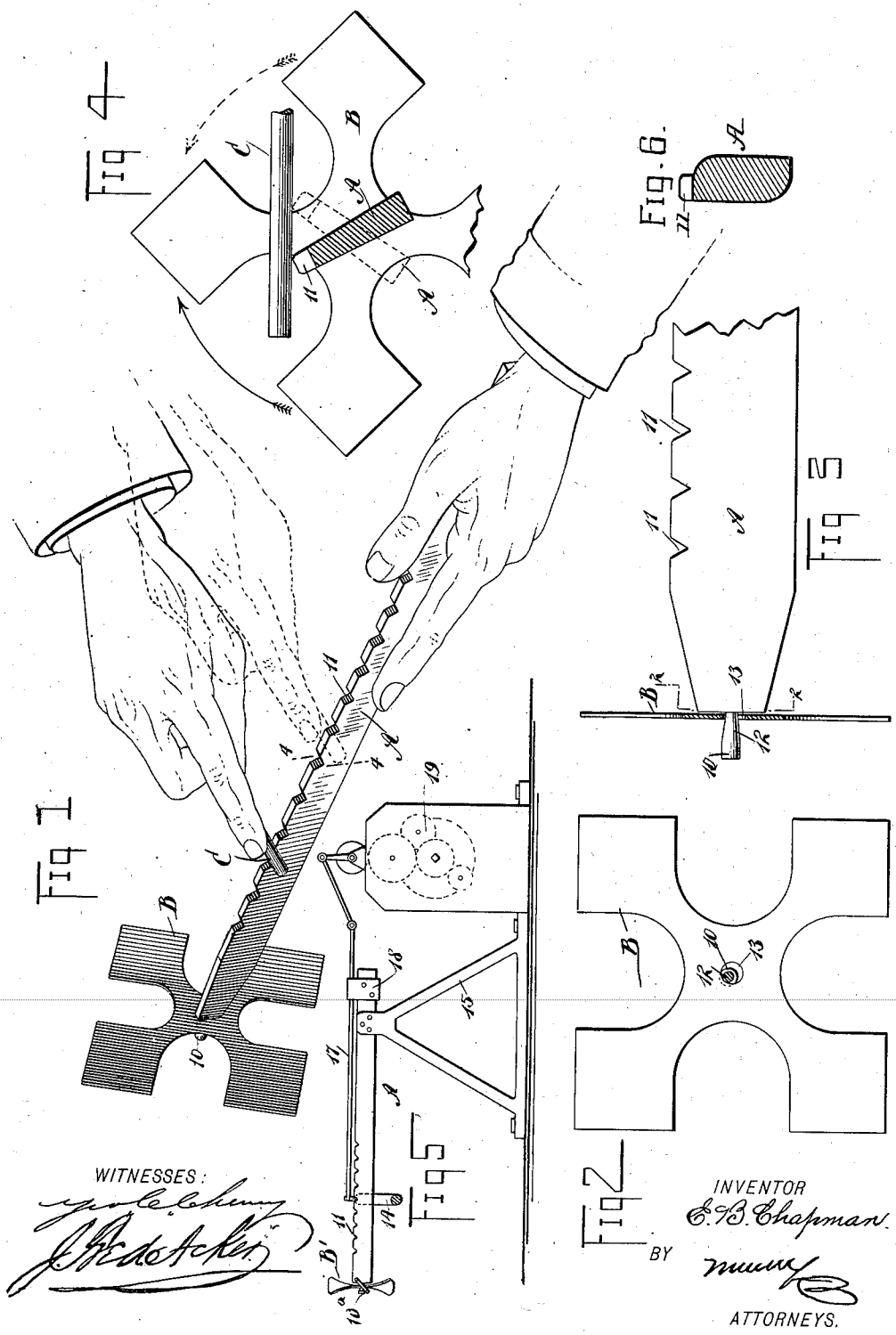
No. 664,382. Patented Dec. 25, 1900.

E. B. CHAPMAN.

DEVICE FOR CONVERTING VIBRATORY INTO ROTARY MOTION.

(Application filed Feb. 10, 1898.)

(No Model.)



WITNESSES:

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DEVICE FOR CONVERTING VIBRATORY INTO ROTARY MOTION.

SPECIFICATION forming part of Letters Patent No. 664,382, dated December 25, 1900.

Application filed February 10, 1898. Serial No. 669,822. (No model.)

To all whom it may concern:

Be it known that I, EUGENE B. CHAPMAN, of Omaha, in the county of Douglas and State of Nebraska, have invented a new and Improved Device for Converting Vibratory into Rotary Motion, of which the following is a full, clear, and exact description.

One object of the invention is to provide a simple and practical device whereby a vibratory movement may be converted into a rotary movement and the direction of rotation be almost instantly changed.

A further object of the invention is to so construct the device that it may be operated by hand or by power or may be utilized as a toy or a fan or employed to supply power for other purposes.

One invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a perspective view of the device used as a toy, illustrating the manner in which the toy is held and in which the device is operated. Fig. 2 is a section taken substantially on the line 2 2 of Fig. 3. Fig. 3 is a vertical section through the rotatable section of the device and a side elevation of the outer end portion of the vibrator. Fig. 4 is a transverse section taken on the line 4 4 of Fig. 1, showing also in dotted lines a shifted position of the vibrator. Fig. 5 is a side elevation of the device utilized as a motive power for operating a fan, and Fig. 6 is a transverse section of the vibrator shown in Fig. 5.

The device consists, primarily, of a vibrator A, a rotatable body B, and an instrument C for operating the vibrator. The vibrator A consists of a bar, stick, or staff of wood, metal, or other suitable material. Usually, however, the vibrator is constructed of wood. A stud 10 is formed at the outer end of the vibrator, the said stud constituting a bearing for the rotatable body B. Preferably the stud 10 is provided with a tapering inner portion 12, upon which tapering portion the rotatable body is adapted to turn. The tapering of the stud obviates the necessity of a nut at the outer end of the stud to prevent the rotatable body when in motion slipping off at the end of the stud. The vibrator is further provided with a series of notches or corrugations 11 in one of its longitudinal faces. The number of notches or corrugations employed and the distance that may intervene between them are immaterial to the operation of the device.

The rotatable body B is virtually a wheel and may be given any desired shape. In the drawings a flat cruciform wheel is illustrated. The wheel may be made from any desired material and may be a humming-wheel or a propeller or fan wheel, or the wheel may be of disk form, and any form of wheel may be so decorated as to produce a display of colors or various designs when the wheel is rotated. An opening 13 is made at the center of the wheel, which opening may readily receive the stud 10, and said opening 13 is of such diameter, as illustrated in Fig. 2, that the wheel when on the stud may have more or less lateral or vertical movement thereon.

The instrument C is adapted to be drawn over the notched or corrugated surface of the vibrator and is of a hard material, preferably metal. It is likewise preferably circular in cross-section, as such shape will cause the least amount of wear on the notched or corrugated surface of the vibrator; but the said instrument may be given any desired cross-sectional shape without departing from the spirit of the invention. When the device is to be operated by hand, the instrument C, which is employed to produce the vibrations, is in the form of a bar; but where the device is to be operated by power the said instrument is preferably given the shape shown in Fig. 5, in which it is in the form of a link-slide 14 of much greater width than the width of the vibrator, so that it extends equally beyond each of its sides, and the upper central portion of the link 14 is reduced in thickness, so that it may readily enter and leave the notches 11 in the vibrator.

When the device is to be operated by power, what may be termed the "rear" end of the said vibrator is secured to a support 15, which may be a frame of any desired shape or simply a tripod, and a rod 17 is at-

tached to the upper central portion of the link-slide 14, which rod is carried rearward through a suitable guide 18, secured to the vibrator, and said rod is connected with a motor 19 in such manner that the rod will be given endwise movement.

In Fig. 5 the wheel B' shown is a fan-wheel, and when this form of wheel is employed the stud 10^a is preferably made straight and provided with a nut on its outer end, and a sleeve or a hub is projected beyond opposite sides of the fan-wheel, so as to provide an extended bearing for the wheel on the stud, enabling the wheel to travel true.

When the device is used as a toy, it is held at its inner end by one hand, as shown in Fig. 1, with an inclination in direction of one side, and the instrument C, by which the vibrations are to be produced, is held in the other hand of the operator, the forefinger being preferably stretched over the upper face of the instrument and carried to a point near where the instrument is to be brought in contact with the vibrator. By moving the instrument backward and forward along the notched or corrugated surface of the vibrator A the vibrations thus produced will be communicated to the stud 10, and the stud 10 will so act upon the wheel B, mounted thereon, as to cause the said wheel to revolve, the number of revolutions of the wheel or its speed being regulated by the rapidity with which the instrument C is drawn over the notched or corrugated surface of the vibrator A. When the vibrator is inclined to the left, as shown in Fig. 1 and in positive lines in Fig. 4, the direction of rotation of the wheel will be toward the right, as shown by the full-line arrow in Fig. 4; but by inclining the vibrator A to the right, as shown in dotted lines in Fig. 4, and continuing the friction of the instrument C on the notched or corrugated surface the direction of rotation of the wheel B will be almost instantly reversed, the wheel then rotating to the left, as shown by the dotted arrow in Fig. 4. Such rotation of the wheel by the vibrations of the vibrator is in a great measure caused by the stud being given a quick lateral and a slight vertical movement, first touching at a side of the opening 13 in the wheel, as shown in Fig. 2, at a point which will give an impulse to the wheel, next moving toward the opposite side of the said opening, and then making a quick return to the initial point, again meeting and striking the edge of the opening in the wheel and imparting to said wheel a further impulse, the direction of impulse being always opposite to the direction in which the vibrator is inclined.

In Fig. 5 the vibrator is shown as held with its notched or corrugated surface perpendicular or upright. When the vibrator is held in this position, the notches or corrugations are arranged to one side of the longitudinal center thereof, as clearly shown in Fig. 6. Instead, however, of holding the vibrator perpendicular or upright and forming its notches or corrugations at one side of the center, it can be secured to its support so as to be held at an inclination in direction of one side, as described with reference to the other figures of the drawings. While the vibrator when used as a toy would not operate successfully in the upright position when the hand instrument is applied thereto, it successfully operates when the link form of instrument is employed, by reason of the notches or corrugations being at one side of the center and the extension of the link beyond the sides of the vibrator.

I desire it to be understood that parallel bars, sticks, or staffs A may be employed, connected where the wheel is to revolve, in which event the notches or corrugations are made upon the opposing faces of the two sticks, staffs, or bars, and the instrument that is to produce the vibrations is to be reciprocated between and in contact with the said notched side surfaces, or that the vibrator may be made of cruciform shape and notches or corrugations may be produced in two or more of the longitudinal edges, the exact form of the vibrator admitting of variation.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination of a support or handle having salient points on its surface, a body adapted to revolve upon the said support or handle, means comprising a rubber adapted to be reciprocated upon the said support or handle to cause the body to revolve, a motor, and a suitably supported and guided connection between said motor and reciprocating means, substantially as described.

2. The combination of a substantially flat support or handle having salient points on its edge, a fan adapted to revolve upon the said support or handle, means comprising a rubber adapted to be reciprocated upon the said support or handle to cause the said fan to revolve, a motor and a suitably supported and guided connection between said motor and reciprocating means, substantially as described.

3. The combination of a substantially flat support or handle having salient points on its edge, a body adapted to revolve upon the said support or handle, and means comprising a rubber adapted to be reciprocated upon the said flat support or handle to cause the said body to revolve, substantially as described.

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Witnesses:
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