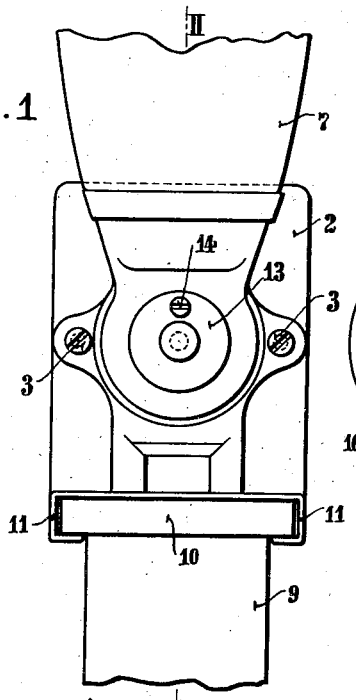
July 5, 1932. J. STOCKERT 1,865,731

COFFEE MILL WITH ELECTRIC DRIVING DEVICE

Filed Aug. 15, 1930

Fig. 1



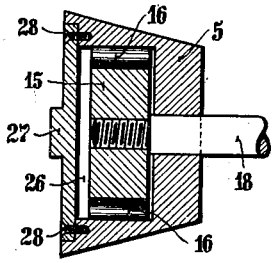


Fig. 4

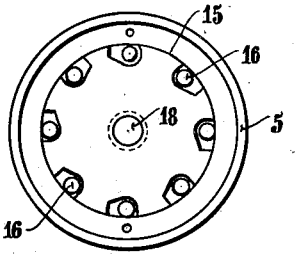


Fig. 5

Fig. 2

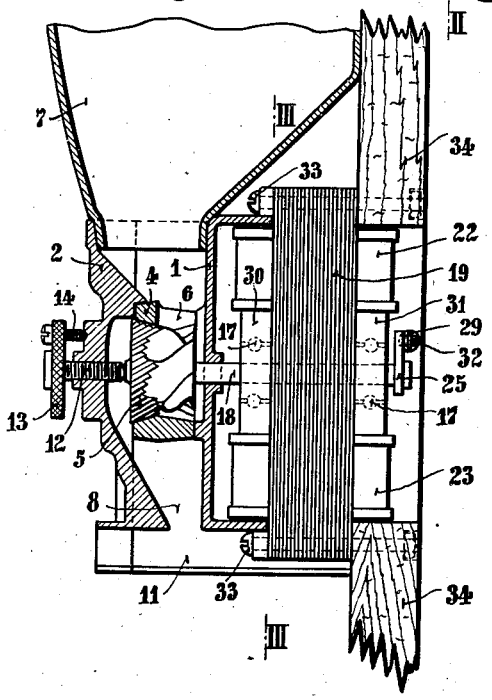
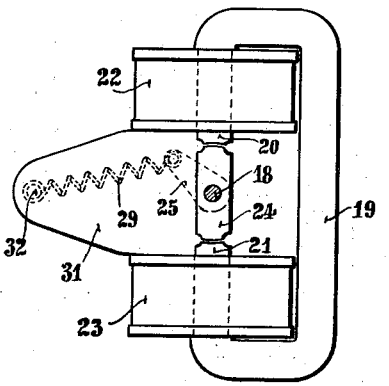


Fig. 3



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UNITED STATES PATENT OFFICE

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COFFEE-MILL WITH ELECTRIC DRIVING DEVICE

Application filed August 15, 1930, Serial No. 475,574, and in Germany August 20, 1929.

The present invention refers to a coffee-mill with an electric driving device. The novelty of this invention is substantially, that the driving device consists of a magnetic system, provided with an oscillating armature, whose coacting fixed poles are located outside the path of the armature, so that the armature can swing freely past the poles. The transmission of motion from the swinging armature to the grinding device of the mill may be suitably carried out by a coaster clutch.

Such a driving device is superior to an ordinary electric motor, in that the number of revolutions of the armature-shaft is smaller, so that a saving of the expensive speed reduction gearing required in the case of an ordinary electric motor is effected. In comparison with a magnetic-motor with an abutting armature, this new driving device is superior, because it eliminates the noise, caused by the pounding of the armature against its limiting abutments, even if the latter are cushioned and, moreover, a greater stroke of the armature is obtained.

Then too, a further advantageous development of the present invention may be obtained, by building into the revolving grinding-cone, the ratchet-coupling that serves for transmitting the motion of the armature to the grinding device, so that the grinding-mill may be constructed in a very compact form.

In the accompanying drawing, showing how my invention may be reduced to practice—

Fig. 1 represents a front view of the novel coffee-mill;

Fig. 2 represents a section on line II—II, Fig. 1;

Fig. 3 represents a section on line III—III, Fig. 2;

Fig. 4 represents an axial section through the grinding-cone on an enlarged scale; and

Fig. 5 represents a front view of the grinding-cone at the same scale, the cover being removed to show the coaster clutch.

The coffee-mill as illustrated has a casing, consisting of two parts, (1 and 2) the back part (1) of which carries the electric driving device for the grinding device of the mill. The front part (2), fixed to the back part (1) by the screws (3), houses the grinding device, consisting of a fixed hollow, conical ring (4) and a cone (5), located in the conical ring. Both the rotatable grinding-cone (5) and the fixed grinding-ring (4) are provided with a coarse and a fine toothing on their coacting grinding surfaces at the top, the grinding-ring (4) is provided with an opening (6), through which the material to be ground is fed to the grinding surfaces from a funnel (7), placed on the front part (2) of the casing. Below, the front part of the casing (2) has an outlet (8) through which the ground material falls from the grinding device (4, 5) into a container (9), placed beneath the outlet (8); the container (9) slides on its upper projecting edge (10) in two angular rails (11) provided at the under side of the front part of the casing (2), and may easily be removed. The material entering the grinding-device (4, 5) tends to press the grinding-cone (5) out of the grinding-ring (4) but this is prevented by an adjusting-screw (12) with knurled head (13), threaded into the front part of the casing (2), which permits of an adjustment of the degree of fineness of grinding, by bringing the grinding-cone (5) into closer or farther proximity of the grinding ring (4). The adjusting-screw (12) is secured against displacement by a small set screw (14) threaded into the head (13) and supported on casing (2).

The grinding-cone (5) is driven through a coaster clutch (15, 16) by a shaft (18) carried in two ball bearings (17). The clutch is built into the interior of the grinding-cone and protected by a cover (27) which closes the cone opening (26) and is attachable by screws (28). Shaft 18 is driven by a magnetic motor with oscillating armature arranged in the rear casing portion (1). The motor consists of a U-shaped magnet made of laminated iron, each of the opposing pole shanks (20, 21) carrying an exciting coil (22, 23). The ends of the shanks are cylindrically concave and form the pole faces of the magnet. The armature (24) is mounted on shaft 18 and swings clear between the two

poles of the magnet, its end surfaces being cylindrically convex to conform with the contour of the pole faces of the magnet (19), so that the armature ends may be spaced as close as possible with respect to the poles. To the rear end of the armature shaft (18) is fixed an arm (25), the free end of which is hooked to a spring (29), which tends to force the armature with a constant unidirectional pull away from the pole faces (20, 21) of the magnet, thus imparting one direction of movement to the armature, while the magnetic pull imparts movement in the other direction. The two ball bearings of the armature-shaft (18) are mounted in two plates of vulcanized fibre (30, 31) fixed between the two magnet-coils (22, 23). One (31) of the two plates (30, 31) is provided with an extension, on which a stud (32) is arranged for supporting the other end of the spring (29), which acts on the armature (24). The casing of the mill (1, 2) together with the driving motor is fastened to a wooden panel (34) by means of screws (33), which permits convenient attachment of the mill to a wall.

The machine works in the following manner:— The motor of the mill is supplied with alternating current. In the position Fig. 3, the armature (24) is positioned in line with the pole shoes (20, 21) i. e. the magnetic fields between the momentarily opposing poles of the armature (24) and of the fixed magnet (19) are closed. At that time the spring (29) acting on the armature (24) is extended. At the next moment, the magnetic fields of the poles (20, 21) of the fixed magnet (19) are reversed or opened by the alternating current, so that the armature (24) is drawn back by the spring (29). The direction in which the armature (24) recedes from the poles is compulsory in consequence of the spring (29), which draws the armature constantly in one and the same direction. The backward and forward motion of the armature (24) is transmitted by the armature-shaft and coaster clutch (15, 16) to the grinding-cone (5), which performs a rotary movement only in one direction, in consequence of the employment of this type of clutch. In combination with the grinding-ring (4) the grinding-cone (5) grinds the material falling in through the opening (6) in the grinding-ring (4), and introduced through the funnel (7). After the grinding is effected, the finely ground material escapes between the grinding-cone and ring and is caught in the container (9).

If the material is to be ground finer, it is only necessary to loosen the small screw (14) and turn the set-screw (12) clockwise, so that the grinding-cone (5) is inserted a little farther into the cone-shaped hollow of the grinding-ring (4); then the material between the cone and the ring will be finer. When the desired degree of fineness has been attained, the set-screw (12) is fixed by tightening the screw (14).

Naturally, the invention is not limited to the illustrated example, but other constructions are also possible. More especially, the motor may in certain cases be driven by intermittent continuous current, as the equivalent of alternating current, so far as the present invention is concerned.

I claim:

1. In an electrically driven coffee-mill, in combination a magnetic motor having fixed field poles, energizable by alternating operating current, an armature disposed between said poles to freely swing past them, a spring connected to said armature and disposed to counteract the attractive forces exerted by said poles, whereby said armature oscillates past said poles, a rotary grinding element and a coaster clutch for coupling said grinding element with said armature for step by step operation of said grinding element in grinding direction.

2. In an electrically driven coffee-mill, in combination a magnetic motor having fixed field poles, energizable by alternating operating current, an armature disposed between said poles to freely swing past them, a spring connected to said armature and disposed to counteract the attractive forces exerted by said poles, whereby said armature oscillates past said poles, a rotary grinding element and a coaster clutch housed within said element for coupling said grinding element with said armature for step by step operation of said grinding element in grinding direction.

In testimony whereof I affix my signature.

JOSEF STOCKERT.