

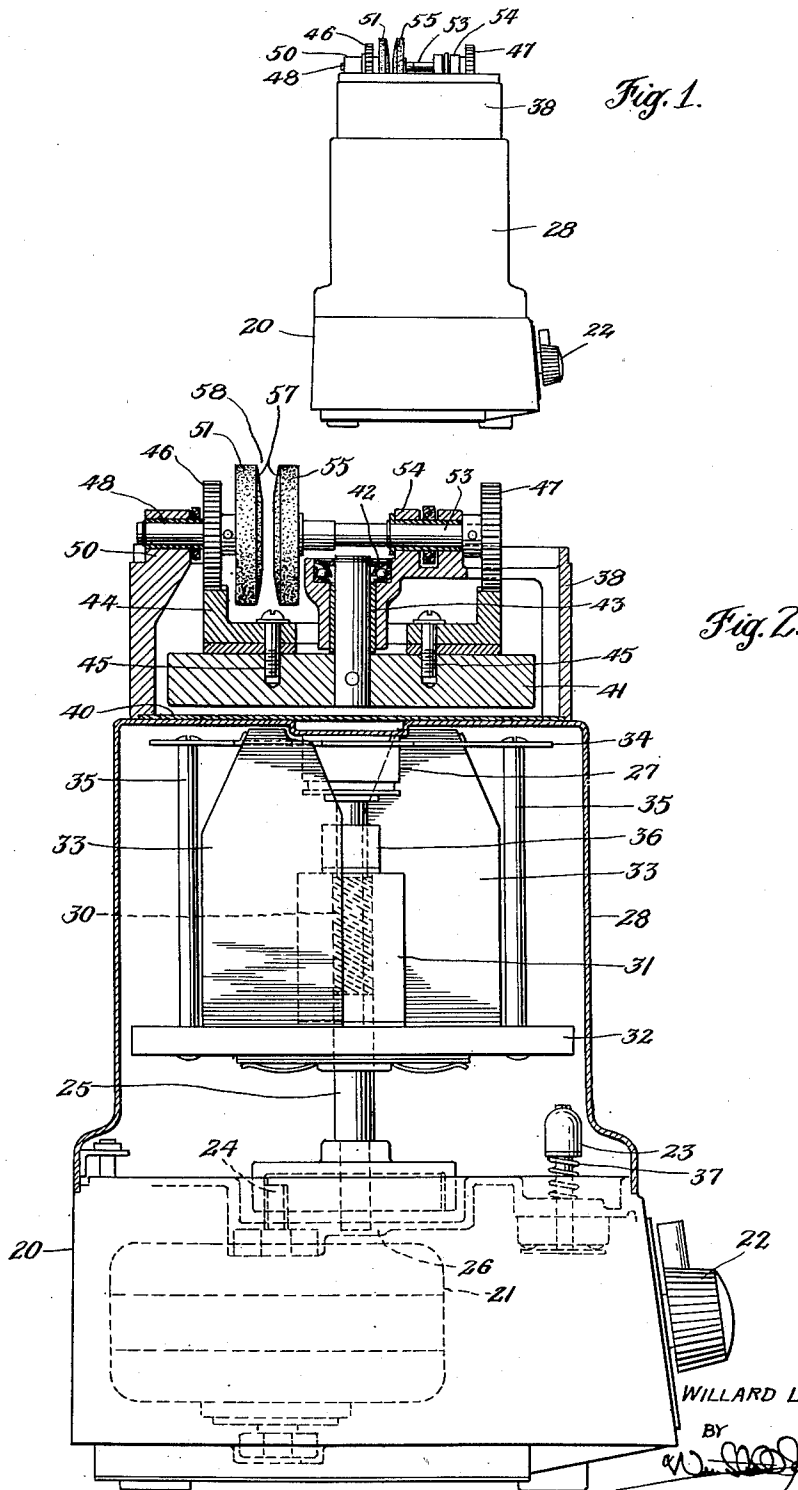
May 6, 1952

W. L. MORRISON, JR
MAGNETIC POWER DEVICE

2,595,872

Filed Sept. 21, 1949

2 SHEETS—SHEET 1



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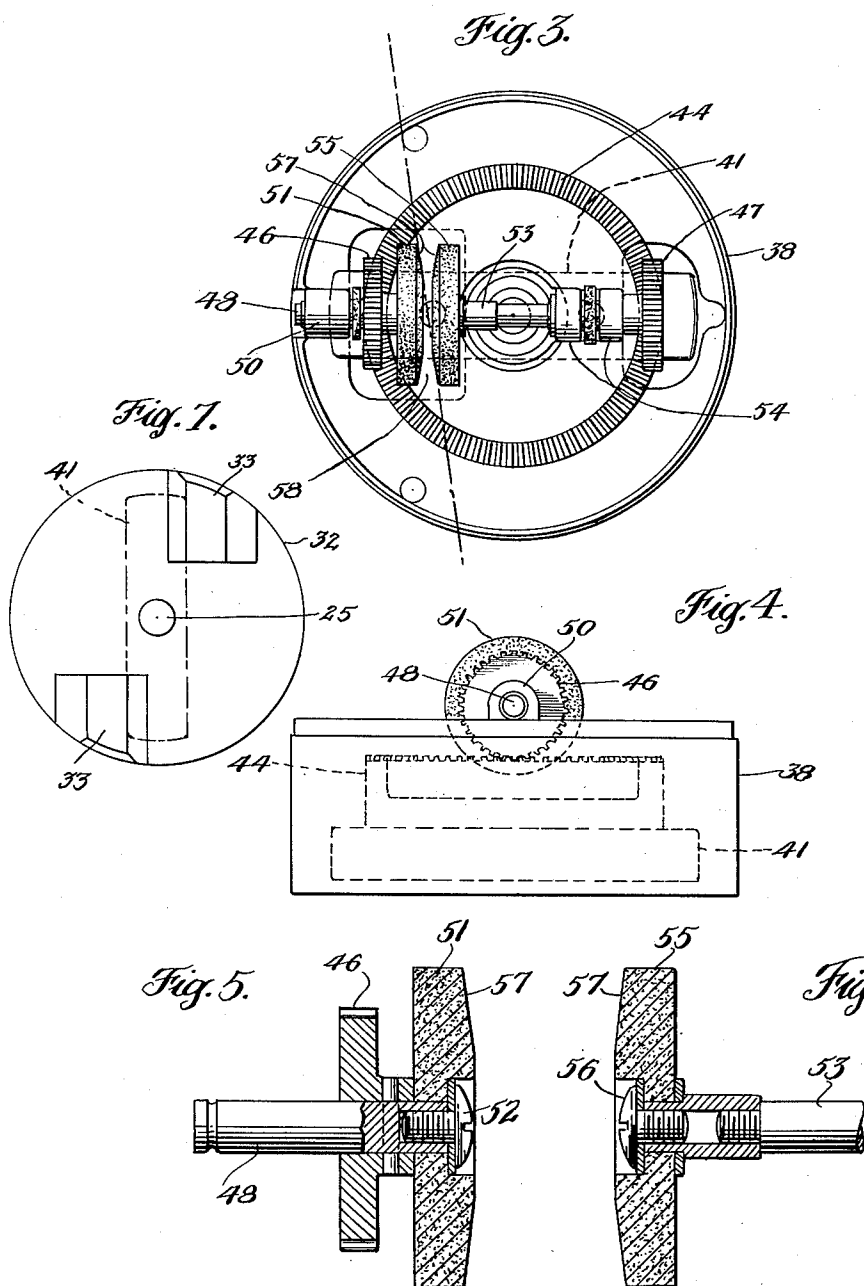
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UNITED STATES PATENT OFFICE

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MAGNETIC POWER DEVICE

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3 Claims. (Cl. 51-134.5)

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The present invention relates to magnetic power devices, especially of the type which operate household appliances and particularly to grinders, such as knife sharpeners.

A purpose of the invention is to support the rotatable keeper of a magnetic power unit from a shaft and bearing located on the side remote from the magnet and thus provide for close coupling.

A further purpose is to interpose a nonmagnetic wall between the keeper and the magnet, forming the bottom of a housing for the keeper above the nonmagnetic wall.

A further purpose is to provide a ring gear on the side of a keeper remote from the magnet and to drive other mechanism from that ring gear.

A further purpose is to intermesh transverse gears with the ring gear and to extend opposed grinding wheel shafts from the transverse gears.

Further purposes appear in the specification and in the claims.

In the drawings I have chosen to illustrate one only of the numerous embodiments in which my invention may appear, selecting the form shown from the standpoints of convenience in illustration, satisfactory operation and clear demonstration of the principles involved.

Figure 1 is a side elevation of a magnetic power unit and power take-off according to the invention.

Figure 2 is an enlarged elevation partly in central vertical section.

Figure 3 is a top plan view of the power take-off of Figure 2.

Figure 4 is an end elevation of the power take-off unit (knife sharpener).

Figures 5 and 6 are detail axial sections of the grinding wheels, shafts and transverse gears.

Figure 7 is a diagrammatic top plan view of the rotor showing the relation of the rotor magnets to the keeper when the power take-off is operating.

In the drawings like numerals refer to like parts.

In the prior art efforts have been made to operate various accessories, including knife sharpeners, from magnetic power units. An example of the same appears in Jerome L. Murray U. S. patent application Serial No. 771,176, filed August 27, 1947, for Mixer and Processor for Home Use and the Like.

The present invention is designed particularly to simplify the construction of power take-off units, whether for knife sharpener or other de-

vices, and to reduce the cost or size of the magnetically susceptible elements required. The invention also provides for closer coupling between the driving magnet and the driven keeper, and for more effective and efficient bearing support of the keeper.

In accordance with the invention, the keeper is turned by the magnet of the magnetic power unit on an axis which is coaxial with that of the magnet or at least parallel thereto. The keeper is preferably mounted in a separate power take-off unit which may be regarded as a separate accessory.

In order to obtain extremely close coupling between the magnet and the keeper, the bearing support for the keeper is provided on the side remote from the magnet. Thus where the keeper is positioned above the magnet, the keeper is desirably hung from a bearing above the keeper, thus eliminating the space required for a bearing between the magnet and the keeper and also allowing for slight orientation of the axis in any play allowed by the bearing.

The keeper and its bearing are desirably located inside a housing, separate from the power unit housing, and the housing is provided with a nonmagnetic bottom wall which extends between the keeper and the turning magnet, preferably in close proximity with the keeper.

In using the device for a power take-off, a ring gear is preferably positioned on the side of the keeper remote from the magnet, coaxial with the keeper and intermeshing with transverse gears. One of the transverse gears drives a grinding wheel in a preferred embodiment, and preferably the opposite transverse gear drives an opposed grinding wheel in the opposite direction.

It will be understood, of course, that the exact character of gearing which permits intermeshing between the ring gear and the transverse gearing will vary in various applications, it not being important in many cases whether bevel gears or straight transverse gears are used.

It will, of course, be understood that the housing separation wall for the keeper should preferably be of non-magnetic material.

Insofar as the present invention involves the bearing suspension on the remote side of the keeper from the magnet, it is to be regarded as immaterial whether the keeper is used directly to apply force from the keeper surfaces as in the case of the stirrers or mixers shown in the Murray patent application above referred to, or whether the keeper applies force through sepa-

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rate mechanism, as in the knife sharpener of the present invention.

The magnetic power unit of the invention comprises a base housing 20 supporting a vertical electric motor 21 controlled by a switch 22 and cut-off by a switch 23. The motor 21 is connected by gearing 24 with a rotor shaft 25 turning in a bottom bearing 26 in the housing and in a top bearing 27 on the under side of the top of a non-magnetic casing 28 surrounding the rotor and supported on the bottom housing. The rotor shaft 25 has threads 30 in the direction which will raise the rotor when the shaft turns forwardly, and the threads 30 engage and freely run with the threads on nut 31 surrounding the rotor shaft. The nut 31 interconnects with a rotor base 32 preferably of magnetically susceptible material which supports upwardly directed permanent magnets 33. At the top of the rotor a non-magnetic plate 34, cut out to clear top bearing 27, supports the magnets and is held to the rotor base by studs 35.

The rotor is limited in upward motion by a collar 36 on the rotor shaft engaging nut 31, and is limited in downward motion by rotor base 32 engaging cut-off switch 23 against the action of switch compression spring 37. When the rotor is in upper position it creates a turning magnetic field close coupled to the keeper. When the rotor is in the lower position the keeper can be readily removed.

It will be understood that any suitable magnetic power unit creating a turning magnetic field may be used.

Resting on the casing 28 is a suitably non-magnetic power take-off housing 38 having a nonmagnetic bottom wall 40 close to the top of the permanent magnets. In close proximity above the bottom wall is a turnable magnetically susceptible keeper 41, suitably of soft steel, which is rotatably supported on a vertical axis by a thrust bearing 42 above the keeper and a journal bearing 43 below the thrust bearing. Both bearings are on a hub of the power take-off housing. Any play in the bearings permits slight adjustment of the keeper axis.

A ring gear 44 coaxial with the keeper is secured to the upper face by screws 45.

At diametrically opposite points the ring gear intermeshes with coaxial transverse gears 46 and 47 whose axis is on a diameter of the ring gear. Transverse gear 46 is on shaft 48 which is journaled in bearing 50 on the housing, and carries, at the end directed toward the opposite transverse gear, a grinding wheel 51 secured by a screw 52. Transverse gear 47 is on shaft 53 journaled at 54 on the housing and carrying, at the end toward the opposite transverse gear, a grinding wheel 55 secured thereon by a screw 56.

The grinding wheels, of carborundum or the like, are bevelled at 57 if desired to provide a slot 58 to receive a knife blade to be sharpened.

The power take-off housing will ordinarily be heavy enough so that it will not need to be locked against turning relative to the magnetic power take-off unit.

In operation it will be evident that the power take-off unit of the invention will be suitably placed on the power unit and the power unit will be started, turning the magnet in the power unit and thereby turning the keeper in the power take-off unit. Due to the bearing suspension of the keeper from above, the keeper can have extremely close coupling with the magnet. The bottom of the power take-off housing, being thin and of

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nonmagnetic material, does not appreciably increase the air gap.

As the keeper turns it is pulled toward the magnet, tending to hold the power take-off firmly against the housing of the power unit. The bearing suspension slightly readjusts the axis of the keeper within the limits of any play to provide uniform magnetic force distribution, thus giving uniform force application.

As the keeper turns it turns the ring gear, which in turn rotates the transverse gears on the same axis but in opposite directions. Thus the grinding wheels at the adjoining ends of the transverse gear shafts are driven in opposite directions, producing a favorable relationship for knife sharpening. It is then merely necessary to insert the knife blade or other article to be sharpened between the opposed cooperating grinding wheels in an angular position to contact the opposite bevelled surfaces as suggested by the dot-and-dash line, Figure 3, and both sides of the blade can be sharpened at the same time without any difficulty through tendency to push the blade longitudinally. It will be understood, of course, that the exact form of the grinding wheels will vary with the particular surface. Likewise the grinding wheels may be coarse or fine in texture and may be operated wet or dry.

While reference has been made herein to a permanent magnet or magnets supported on a rotor for creating the turning magnetic field, questions of whether the magnetic driving field is created by a permanent magnet, an electromagnet or some combination of the same, or by magnets on a rotor or a magnet which forms the entire rotor are not critical in the present invention, and it will be understood that variations in these features may be employed if desired.

It will be evident, of course that the knife sharpener can be provided with a suitable cover slotted to admit the knife and protecting the user from contact with the gear.

In view of my invention and disclosure variations and modifications to meet individual whim or particular need will doubtless become evident to others skilled in the art, to obtain all or part of the benefits of my invention without copying the structure shown, and I, therefore, claim all such insofar as they fall within the reasonable spirit and scope of my claims.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. In a magnetic power device, a magnetic power unit including a turning magnet, a magnet keeper turned by the magnet, means mounting the keeper for rotation, a ring gear on one side of the keeper coaxial with the keeper, a gear transverse to the ring gear and intermeshing with it, a shaft transverse the axis of the keeper mounting the transverse gear and a grinding wheel on the shaft.

2. In a magnetic power device, a magnet keeper, a shaft and bearing rotatably supporting the keeper, a ring gear coaxial with the keeper and mounted thereon, transverse gears intermeshing with the ring gear and coaxial with one another, shafts on the transverse gears extending toward one another and opposed grinding wheels on the shafts just mentioned.

3. In a magnetic power device, a self-contained housing having a nonmagnetic bottom wall, a rotatable magnet keeper in the housing adjacent the bottom wall, a shaft and bearing supporting the keeper on the side remote from the bottom

wall, the shaft extending vertically and the bearing being mounted on the housing, a ring gear coaxial with the keeper on the upper side thereof, transverse gears intermeshing with the ring gear and located above the same coaxial with one another, transverse shafts on the respective transverse gears extending toward one another, bearings in the housing for the transverse shafts and opposed grinding wheels on the adjoining ends of the transverse shafts.

WILLARD L. MORRISON, JR.

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