Dec. 4, 1934. R. HOE 1,983,292

POWER UNIT

Original Filed Jan. 2, 1930 3 Sheets-Sheet 1

Fig. 1.

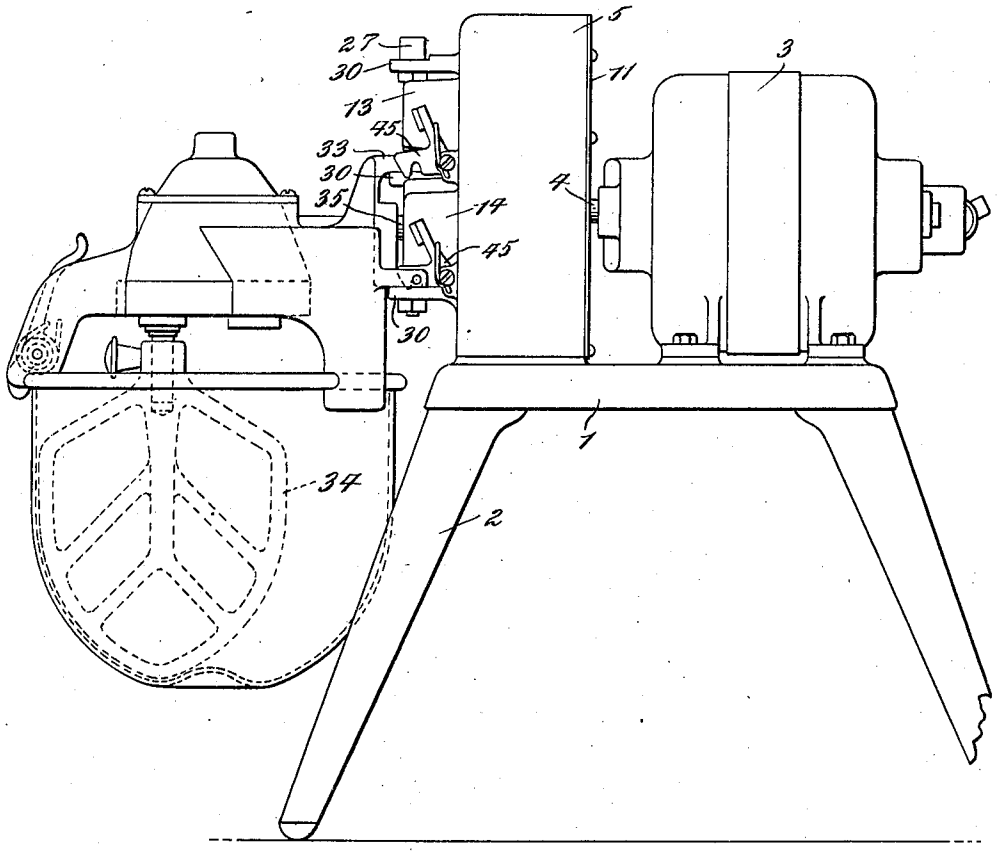
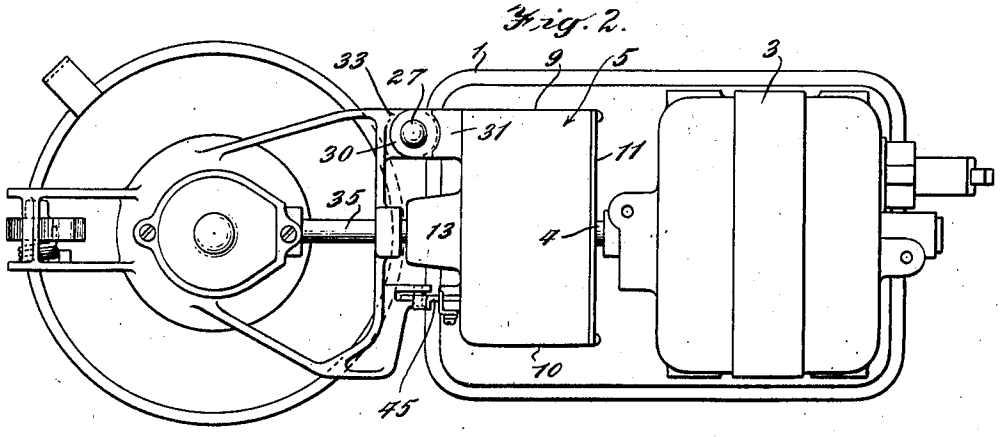


Fig. 2.



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Fig. 3.

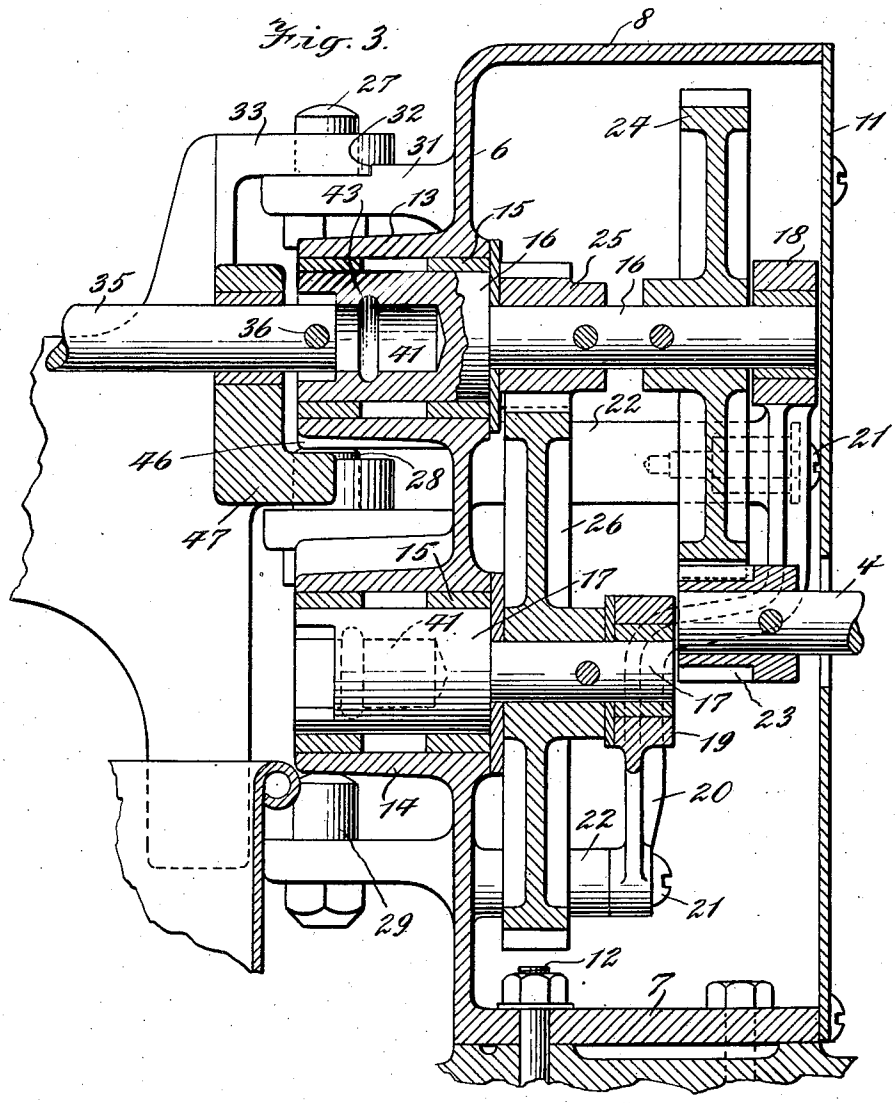
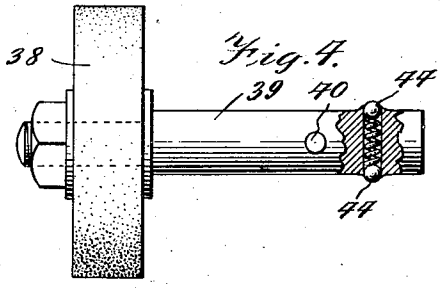


Fig. 4.



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Fig. 5.

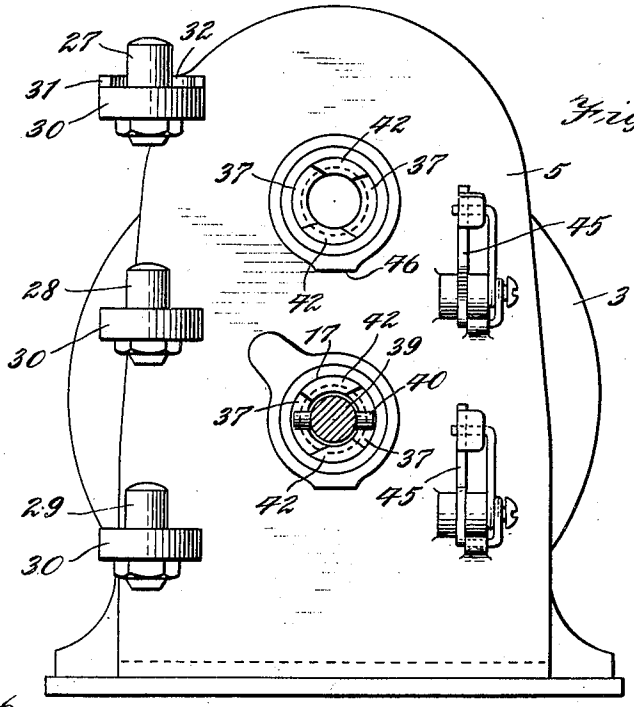


Fig. 6.

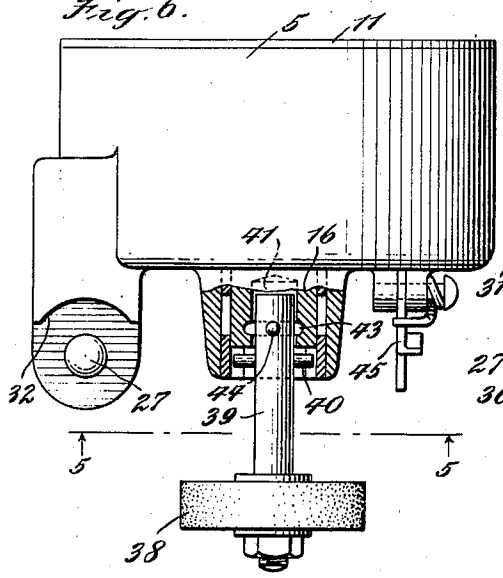
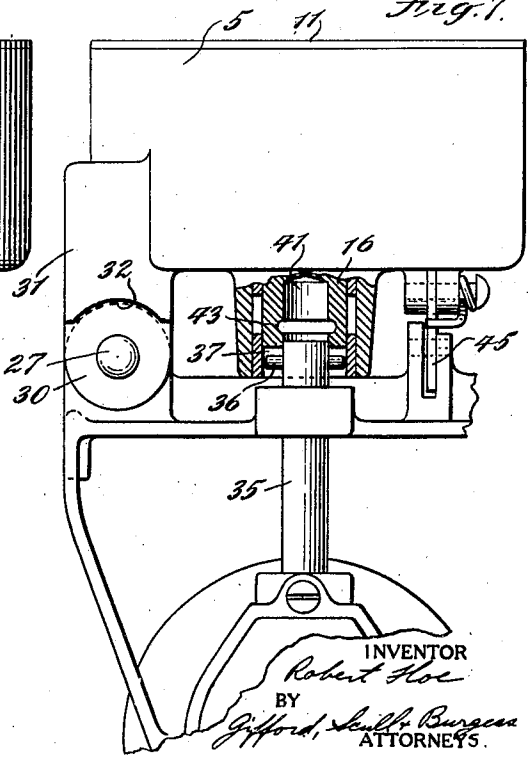


Fig. 7.



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UNITED STATES PATENT OFFICE

1,983,292

POWER UNIT

Robert Hoe, Hyde Park, N. Y.

Original application January 2, 1930, Serial No. 418,109, now Patent No. 1,864,304. Divided and this application December 16, 1930, Serial No. 502,707

8 Claims. (Cl. 74—16)

This invention relates to a novel and improved power unit and is a division of my copending application Serial No. 418,109. The novel features will be best understood from the following description and the annexed drawings in which I have shown a selected embodiment of the invention, and in which

Fig. 1 is a vertical elevation of a power unit having one type of device associated therewith.

Fig. 2 is a plan view of the structure appearing in Fig. 1.

Fig. 3 is a vertical sectional view through the casing containing the gearing.

Fig. 4 is a view showing one form of device which may be operated from the power unit.

Fig. 5 is a view showing the left-hand end of the casing as appearing in Fig. 3 and taken on the line 5—5 of Fig. 6.

Fig. 6 is a plan of the casing appearing in Fig. 5 when having applied thereto the device shown in Fig. 4.

Fig. 7 is a view similar to Fig. 6, but showing the casing having applied thereto the device shown in Figs. 1, 2 and 3.

Referring first to Figs. 1 and 2, I have shown therein a base 1 supported by legs 2 and carrying a motor 3 having a shaft 4. Also mounted on the base 1 is a gear casing 5 which, as best shown in Fig. 3, is formed of a vertical wall 6 having integral therewith the bottom wall 7, top wall 8 and side walls 9 and 10. The result is an integral box with only one open side which is closed by means of a plate 11. The box may be secured to the base as by bolts 12.

The wall 6 is provided with a plurality of bearings here shown as two in number, these bearings being formed partly in bosses 13 and 14 extending outwardly from the wall, and each boss is provided with bushings 15 within which are received the enlarged ends of shafts 16 and 17. These two shafts are parallel to each other and the enlarged ends disposed in the bosses are provided with clutch elements which will be more fully described later, so that these two shafts form the driving shafts of the power unit.

The shafts 16 and 17 are further supported in bearings 18 and 19 carried on a supporting frame work 20 which is secured to the wall 6 by suitable screws 21. The wall 6 may be provided with bosses or spacers 22 in which these screws may be threaded and these bosses may be connected to the side walls, thus forming a rigid structure.

The end of the motor shaft 4 extends through an opening in the plate 11 into the casing, and has on its end a pinion 23 meshing with a gear 24 on the shaft 16. This arrangement, as will be seen, provides a reduction gearing between the shafts 4 and 16, and a further reduction gearing is provided between the shafts 16 and 17 by the pinion 25 on the shaft 16 meshing with the gear 26 on the shaft 17. By this arrangement, it will be seen that the shaft 16 is rotated in one direction at a relatively high rate of speed, whereas the shaft 17 is rotated in the opposite direction at a relatively low rate of speed. In one embodiment which I have built, the shaft 16 is designed to rotate at a speed of 381 R. P. M. and in a clockwise direction, while the shaft 17 is designed to rotate at a speed of 92½ R. P. M in a counterclockwise direction.

Each of the shafts 16 and 17 is designed to operate some device which may be detachably connected to the unit and, usually, such a device is intended to be hinged to the unit so that it may be swung into and out of a position wherein it will be operated by one of the driving shafts. In the form shown, I provide three hinge pins 27, 28 and 29, arranged vertically one beneath the other. It will be seen that the pins 27 and 28 are arranged on opposite sides of the shaft 16, whereas the pins 28 and 29 are arranged on opposite sides of the shaft 17. By this arrangement, the intermediate pin 28 forms a common hinge element which may be used with a device operated by either shaft.

Each of the pins 27, 28 and 29 is supported on an ear 30 projecting from the casing, and on the ear 30 which supports the pin 27 I have shown an upwardly extending lug 31 having its face 32 spaced from the pin 27 and parallel thereto, although this is not essential. The space between the face of the pin 27 and the face 32 of the lug is such that a hinge element cooperating with the pin 27 may be received between the pin and the lug if properly designed to fit into this space, but if not so designed, the lug will prevent the hinge element from coming to rest on the pin to a sufficient extent to prevent the device carried by the hinge element from being operated by the shaft 16.

Certain devices which are adapted to be used in connection with a power unit may be safely operated at different speeds, while others should be operated only at low speeds. Therefore, the devices which may be operated at low speeds are provided with hinge elements in the form of ears 33 of such size that they can be received only on the pins 28 and 29 but will not fit between the pin 27 and the face of the lug 31. On

the other hand, a device which can be safely operated at a relatively high speed at which the shaft 16 rotates is provided with a hinge element in the form of an ear which can be received on the pin 27, without being obstructed by the lug 31. This provides a safety device which is of prime importance on a power unit of this type which is designed for use in the home. For example, the beater 34 shown in Figs. 1 and 2 is one form of a device which may at different times be properly operated at different speeds, and this device can be placed upon either the pins 28 and 29 as in Fig. 1, or the pins 27 and 28 as in Fig. 3. When placed upon one set of pins, it will cooperate with the driving shaft 17, and when placed on the other set it will be driven by the shaft 16, although in the opposite direction.

Incidentally, the safety feature described above is used to prevent the rotation of a device in the wrong direction, a device which should be rotated in one direction only, being designed to operate say with the shaft 17, and its hinge element 33 being designed so that it cannot be placed upon the pin 27. Each device to be operated by the power unit has incorporated therein a driven shaft which is to be operated by either the shaft 16 or 17 through suitable clutch connections.

In Fig. 3, is shown the shaft 35 on the device 34, this shaft being in this instance driven from the shaft 16 through a clutch connection consisting of a pin 36 extending laterally from the shaft 35 and adapted to be received in opposite recesses 37 in the end of the shaft 16 or 17.

In Figs. 4 and 6 are shown a form of device which may be secured to and driven from one of the driving shafts 16 or 17 without the hinge support previously described. This device is illustrated as a grinding wheel 38 mounted on a shaft 39, from which extends a laterally disposed pin 40 adapted to be received in the recesses 37 of one of the shafts 16 or 17. As best shown in Figs. 3, 6 and 7 each shaft 16 and 17 is provided with a centrally disposed longitudinally extending bore 41, and this bore will be described with respect to the shaft 16, the shaft 17 being of identical construction.

As will be seen, this bore has a portion substantially of the size of the driven shaft of the device operated by the shaft in which the bore is provided, so that a driven shaft may be inserted in the bore. In Fig. 3, the driven shaft terminates in the outer end of the bore which is enlarged, as shown in Figs. 5, 6 and 7, to form the recesses 37. It will be noted by reference to Fig. 5, that these recesses are separated by elements 42 which are adapted to engage with the pin 36 or 40. The elements 42 and 36 or 40 form the coacting clutch element on the different shafts.

The inner end of the bore 41 is provided with a circumferentially extending groove or recess 43 which has no function when a device such as that shown in Figs. 1, 2, 3 and 7 is used. In such a device, the hinge and a suitable latch to be described later are used to hold the shafts in position. However, there are devices which may be used with a power unit, which it is not necessary or desirable to hinge to the unit such, for example, as the wheel 38. This wheel may be a grinder or polisher, and is of such character that it is more economical to avoid a hinge to support the same. In place of a hinge, the shaft 39 supporting the wheel is provided with one or more spring pressed balls 44 forming detents which are adapted to engage in the circumferential groove 43. By this arrangement, the shaft 39 may be inserted in the bore 41, the ball or balls 44 being received in the groove to hold the shaft 39 in position wherein the clutch element 40 will cooperate with the clutch elements 42, and thus the shaft 39 will be driven by the shaft 16.

When the power unit is used with a device hinged thereto, the device is held in position by a latch indicated generally at 45, one such latch being associated with each of the shafts 16 and 17. The details of these latches are more fully described and are claimed in my aforesaid copending application Serial No. 418,109.

When a driving shaft on the unit and a driven shaft on a device are brought into cooperative relation, it is essential that this relation should be maintained. This relation might be disturbed by the operation of a device which would tend to lift the hinge ears from their pins. This is apt to occur, for example, if for any reason the driving and driven shafts are out of alignment, in which case one end of a pin 36 will strike a clutch element 42 before the other end will. In order to insure the correct positioning of the shafts and the maintenance of this position, I provide cooperating elements on the unit and of the device which will prevent movement of the device on its hinges. In this embodiment, each one of the bosses 13 and 14 is provided on its bottom with a flattened portion 46, beneath which is received a lug 47 on the device which is being driven from the shaft within the particular boss. This arrangement is best shown in Figs. 3 and 5.

It is to be understood that various changes in the embodiment of the invention illustrated and described herein may be made within the scope of the invention, and therefore I do not intend to limit myself, except by the appended claims.

I claim:—

1. A power unit having a gear casing with a driving shaft mounted thereon, means on said shaft adjacent one end thereof to support and rotate a driven shaft on an operative device, means to support a different operative device on said casing, said second named device also having a driven shaft, and means to operate said last-named driven shaft from said end of said driving shaft.

2. A power unit having a gear casing and a driving shaft mounted therein, a device having a driven shaft, means to hinge said device to the casing, cooperating clutch elements on said driving and driven shafts, means to hold said device on the hinge in position wherein said clutch elements operate to drive the driven shaft from the driving shaft, means on the driving shaft to support a second device having a driven shaft by engagement with said driven shaft and said driving shaft, and clutch elements on the driven shaft of said second device cooperating with the clutch elements on the driving shaft.

3. A power unit comprising a casing having a driving shaft mounted thereon, said driving shaft having a longitudinally extending bore at the end thereof, with the outer end of the bore enlarged to form an outwardly facing recess, a device having a driven shaft provided with means adapted to be received in said recess to form a driving connection between the shafts, means to support said device on the casing with said shafts in operative position, said bore having a substantial depth to receive a shaft on a second device closely fitting in said bore and having means adapted to

be received in said recess to form an operative connection between said shafts, whereby said second device may be substantially entirely supported by the driving shaft.

4. A power unit comprising a casing having a driving shaft mounted thereon, said shaft having a longitudinally extending bore and a clutch element at the end thereof, a device having a driven shaft with a clutch element adapted to cooperate with the clutch element on said driving shaft, means to support said device on the casing with said clutch elements in cooperative relation, said bore having a substantial depth to receive a shaft on a second device having a clutch element adapted to cooperate with said first-named clutch element, whereby said second device may be entirely supported within said bore.

5. A power unit comprising a horizontally disposed driving shaft mounted in fixed bearings, one end of said shaft having a longitudinally extending bore therein, a driven shaft having one end closely fitting within said bore whereby the driving shaft supports the driven shaft, a device on said driven shaft and supported thereby directly and entirely by said driving shaft, cooperating clutch elements on said shafts, means other than said driving shaft to support on said unit a second device having a driven shaft, with said driven shaft of the second device in cooperative relation with said driving shaft, said driven shaft of the second device having clutch elements adapted to cooperate with said clutch elements on the driving shaft when the second device is thus supported on said unit.

6. A power unit comprising a horizontally disposed driving shaft mounted in fixed bearings, one end of said shaft having a longitudinally extending bore therein, a driven shaft having one end closely fitting within said bore whereby the driving shaft supports the driven shaft, a device on said driven shaft and supported thereby directly and entirely by said driving shaft, cooperating clutch elements on said shafts, means other than said driving shaft to support on said unit a second device having a driven shaft, with said driven shaft of the second device in cooperative relation with said driving shaft and located out of said bore, said driven shaft of the second device having clutch elements adapted to cooperate with said clutch elements on the driving shaft when the second device is thus supported on said unit.

7. A power unit comprising a horizontally disposed driving shaft mounted in fixed bearings, one end of said shaft having a longitudinally extending bore therein, a driven shaft having one end closely fitting within said bore whereby the driving shaft supports the driven shaft, a device on said driven shaft and supported thereby directly and entirely by said driving shaft, cooperating clutch elements on said shafts, means yieldingly holding said driven shaft in said bore, means other than said driving shaft to support on said unit a second device having a driven shaft, with said driven shaft of the second device in cooperative relation with said driving shaft, said driven shaft of the second device having clutch elements adapted to cooperate with said clutch elements on the driving shaft when the second device is thus supported on said unit.

8. A power unit comprising a horizontally disposed driving shaft mounted in fixed bearings, one end of said shaft having a longitudinally extending bore therein, a driven shaft having one end closely fitting within said bore whereby the driving shaft supports the driven shaft, a device on said driven shaft and supported thereby directly and entirely by said driving shaft, cooperating clutch elements on said shafts, means yieldingly holding said driven shaft in said bore, means other than said driving shaft to support on said unit a second device having a driven shaft, with said driven shaft of the second device in cooperative relation with said driving shaft and located out of said bore, said driven shaft of the second device having clutch elements adapted to cooperate with said clutch elements on the driving shaft when the second device is thus supported on said unit.

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