

Feb. 9, 1954

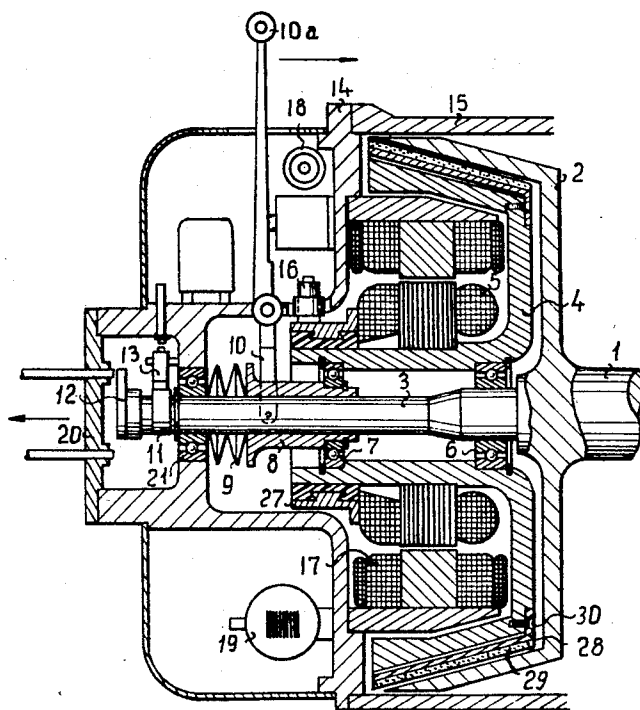
E. UHER  
POWER UNIT

2,668,914

Filed Sept. 4, 1952

2 Sheets-Sheet 1

*Fig. 1*



INVENTOR:-  
Edmond Uher  
BY Brown & Seward  
ATTORNEYS

Feb. 9, 1954

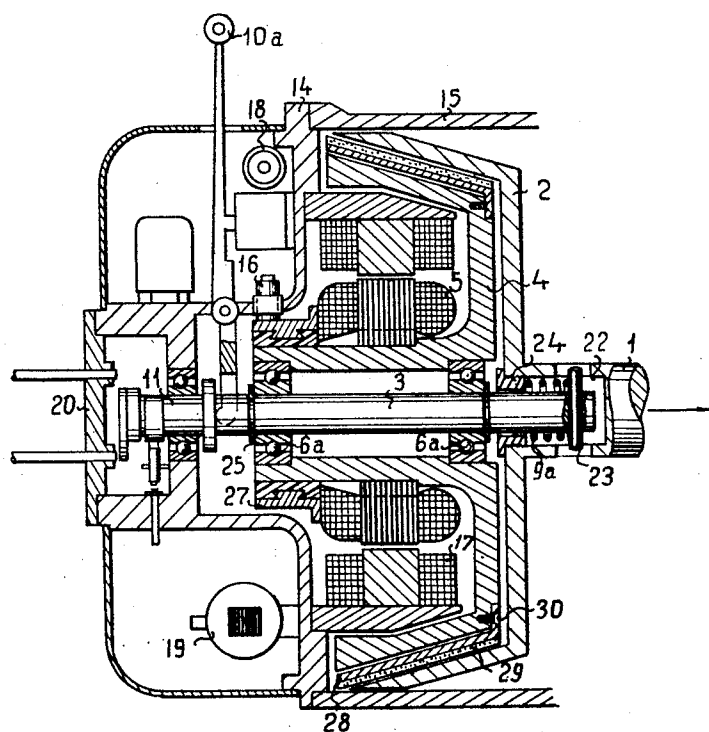
E. UHER  
POWER UNIT

2,668,914

Filed Sept. 4, 1952

2 Sheets-Sheet 2

*Fig. 2*



INVENTOR:-  
Edmond Uher  
By Brown & Seaward  
ATTORNEYS

## UNITED STATES PATENT OFFICE

2,668,914

## POWER UNIT

Edmond Uher, Munich, Germany, assignor to  
Uher Engineering Company, Panama, Republic  
of Panama, a company of Panama

Application September 4, 1952, Serial No. 307,776

Claims priority, application Germany  
September 6, 1951

3 Claims. (Cl. 290—1)

1

My invention relates to power units of the type comprising an internal combustion engine, an electrically driven starter for said engine and ancillary apparatus such as distributors, interrupters, fuel pumps, etc., driven from the crankshaft of said engine.

In such units and for the sake of simple design, the starter should act on the crankshaft of the engine to be started as directly as possible.

Now, on that side of the crankshaft from which power is transmitted, there is but narrow space available, while the other side is usually occupied by ancillary apparatus which are necessarily arranged in the near vicinity of the crankshaft from which they are driven.

The main object of my invention is to provide a power unit of the type described in which the free end of the crankshaft of the internal combustion engine is provided with an extension through said starter, the projecting end of said extension being provided with transmitting means for driving said ancillary apparatus.

A more particular object of my invention is to use in such a power unit an electrically driven fly-wheel starter of the type described in my co-pending application Ser. No. 307,777, filed September 4, 1952.

Other objects, features and advantages of my invention will be apparent from the following detailed description, together with the accompanying drawings, submitted for purpose of illustration only and not intended to define the scope of the invention, reference being had for that purpose to the subjoined claims.

In these drawings:

Fig. 1 is an axial cross-section of an electrically driven fly-wheel starter operatively associated with an internal combustion engine according to my invention.

Fig. 2 is an axial cross-section of a modification of Fig. 1.

On the crankshaft 1 of the internal combustion engine to be started is keyed one member 2 of a clutch. Crankshaft 1 is provided with an extension 3 through the fly-wheel starter. The latter comprises a fly-wheel 4 which constitutes at the same time the other member of the clutch and a rotor 5 of a dynamo-motor unit, said rotor being rotatively fast with said fly-wheel. Rotor 5 is rotatively mounted on the extension 3 of the crankshaft directly by means of a bearing 6 and through a sleeve 8 by means of a bearing 7. Sleeve 8 is subjected to the action of the clutching spring 9. The rotor 5 and fly-wheel 4 are thus adapted to be displaced axially with sleeve

2

8 on extension 3 of the crankshaft and moreover, they are capable of rotating freely with respect to said extension. A yoke 10 is provided for actuating sleeve 8 so as to actuate the clutch 2.

4. In order to actuate ancillary apparatus, such as a current distributor and an interrupter device of a conventional electric ignition system, the condenser and coil of which are shown at 18 and 19, respectively, the extension 3 is provided with an outwardly projecting end portion 11 carrying the rotary member 12 of said distributor and formed with a cam adapted to actuate the movable member 13 of said interrupter device.

It is clear that many other ancillary apparatus could be actuated from said projecting portion 11 within the scope of the invention.

It may be seen that in spite of the arrangement of the fly-wheel starter on that side of the internal combustion engine opposed to the operative end of the crankshaft, the driving of the ancillary devices which are necessarily disposed in the near vicinity of said crankshaft, is in no way compromised.

The rotor 4, 5 of the fly-wheel starter is surrounded by a partition 14 acting as a casing and integral with a flange 15 of the internal combustion engine. Brushes 16 cooperating with a commutator 27 are disposed on the wall of casing 14, while the stator 17 of the dynamo-motor unit is secured inside said casing; distributor 12, interrupter 13, an igniting condenser 18 and an igniting coil 19 of the electric ignition system are moreover arranged outside casing 14, while the latter further contains the yoke 10 provided with a hand-lever 10a, as well as the already mentioned commutator 27 feeding the windings of the dynamo-motor unit. A cover 20 is removably secured on the partition 14 of the casing to protect the device against dust or the like. When cover 20 is removed the electric parts become accessible, which permits repair and adjustment thereof, if required. Partition 14 of the casing moreover carries a bearing 21 on which the extension 3 of the crankshaft 1 is rotatively mounted.

In the alternative arrangement of Fig. 2, extension 3 is, as previously rotatively fast with the crankshaft, but it can be displaced axially with respect thereto; for this purpose, crankshaft 1 is provided with a blind bore 22 in which extension 3 is slidably mounted, a gudgeon 23 fast with extension 3 being slidably engaged in a longitudinal slot of crankshaft 1. In this embodiment the clutching spring 9a is interposed between extension 3 and crankshaft 1, said spring bearing

on the left-hand side of the drawing on a plug 24 screwed or secured in any other suitable manner in said crankshaft and on the other side on the gudgeon 23 of extension 3 so that the latter is continuously urged by said spring 9a inwards inside the blind bore of the crankshaft in the direction of the arrow.

Rotor 5, as well as fly-wheel 4 fast with said rotor, is rotatively mounted on the extension 3 of the crankshaft through ball-bearings 6a or the like. One member 2 of the clutch is also fast with crankshaft 1. The extension 3 comprises, as previously, a projecting portion 11. Otherwise the arrangement is similar to that in Fig. 1.

Since the movable member 4 of the clutch is supported on extension 3, it is subjected to the action of spring 9a and therefore held in pressure contact against the other member 2 of said clutch. To declutch it suffices to displace extension 3 of the crankshaft axially in the direction opposed to the arrow, while further compressing the spring.

This arrangement has the advantage that the coupling spring 9a, in the declutched position, e. g. when compressed at a maximum, does not exert any braking pressure on the rotor 5 so that the latter can reach a very high critical rotation speed and is therefore capable of yielding to crankshaft 1 upon clutching therewith the considerable amount of kinetic energy stored thanks to said high rotation speed.

Furthermore, the whole assembly of the starter and primarily, the dynamo-motor unit, as well as all ancillary apparatus, are easily removable. This whole assembly can be removed from extension 3 of the crankshaft in a direction opposed to the arrow, merely upon withdrawal of a ring 25.

In the two embodiments described above, the invention has been shown in a particular application to electrically driven fly-wheel starters of the type described in the already cited application Ser. No. 307,777. As explained in said application, said fly-wheel starters are characterised by the feature that member 2 of the clutch which is fast with the crankshaft is disposed radially outside rotor 5, stator 17 and member 4 of said clutch.

In the embodiments shown in Figs. 1 and 2, as in the preferred embodiment described in said application Ser. No. 307,777, the friction surface of member 4 is constituted by a frusto-conical rim 28 of elastic and flexible material, removably secured, e. g. by means of screws 30 on member 4 and carrying a friction lining 29.

What is claimed is:

1. A power unit including an internal com-

bustion engine having a crankshaft, ancillary apparatus to be actuated from said crankshaft and a starter comprising a fly-wheel, a friction clutch having a first member rotatively fast with said crankshaft and a second member rotatively fast with said fly-wheel, an electric motor having a stator and a rotor which is also rotatively fast with said fly-wheel, elastic means for normally clutching said first and second member together to operatively connect said fly-wheel with said engine crankshaft, means for declutching said first and second members from each other against the action of said elastic means to let said rotor store into said fly-wheel the kinetic energy required for starting said engine, said clutch first member being more spaced radially than said stator, rotor, fly-wheel and clutch second member from their common axis, an extension for said crankshaft through said starter and means on the portion of said extension projecting from said starter on the side opposite to said engine, to actuate said ancillary apparatus.

2. A power unit according to claim 1 in which said extension is slidably but non-rotatively mounted on said crankshaft, in which an assembly comprising the rotor, the fly-wheel and the second member of the clutch is rotatively but non-slidably mounted on said extension and in which said elastic means are interposed between said crankshaft and extension.

3. A power unit according to claim 1, further comprising a casing partition secured on the casing of the internal combustion engine and bearing means in said partition for said crankshaft extension, the same projecting out of said casing partition and the latter containing and protecting the stator of the dynamo-motor unit while carrying on its outer face commutator brushes as well as said ancillary apparatus.

EDMOND UHER.

#### References Cited in the file of this patent UNITED STATES PATENTS

| Number    | Name        | Date           |
|-----------|-------------|----------------|
| 1,056,417 | Hodgkinson  | Mar. 13, 1913  |
| 1,139,210 | Mitchell    | May 11, 1915   |
| 1,147,956 | Lutz        | July 27, 1915  |
| 1,174,545 | Butterfield | Mar. 7, 1916   |
| 1,207,321 | Wadsworth   | Dec. 12, 1916  |
| 1,396,004 | Apple       | Nov. 8, 1921   |
| 1,442,108 | Vincent     | Jan. 16, 1923  |
| 1,926,029 | Bowes       | Sept. 12, 1933 |
| 2,144,445 | Wilber      | Jan. 17, 1939  |
| 2,410,849 | Waseige     | Nov. 12, 1946  |