

W. B. MOSES.
ELECTRIC STARTING AND LIGHTING APPARATUS FOR AUTOMOBILES.
APPLICATION FILED APR. 15, 1916.

1,380,113.

Patented May 31, 1921

3 SHEETS—SHEET 1.

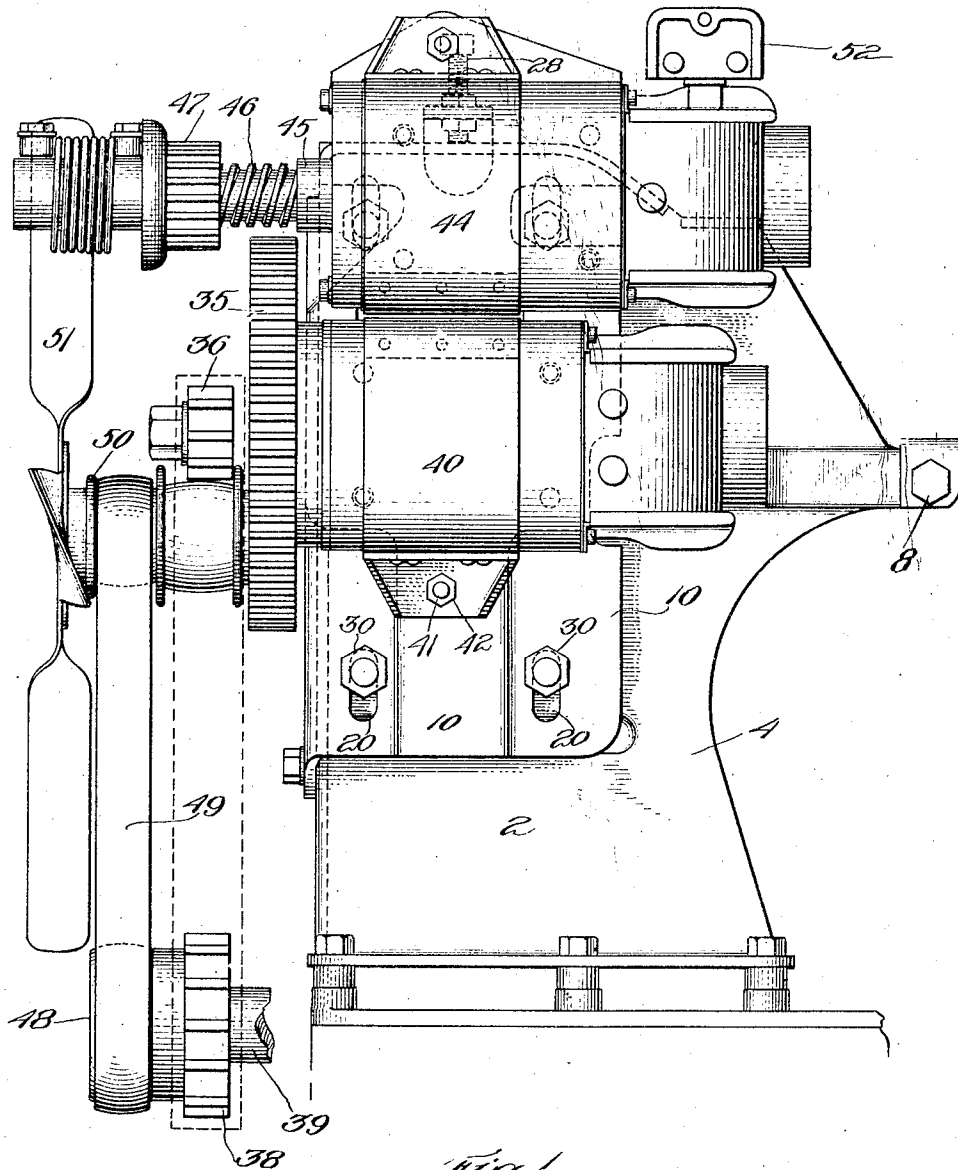


Fig. 1.

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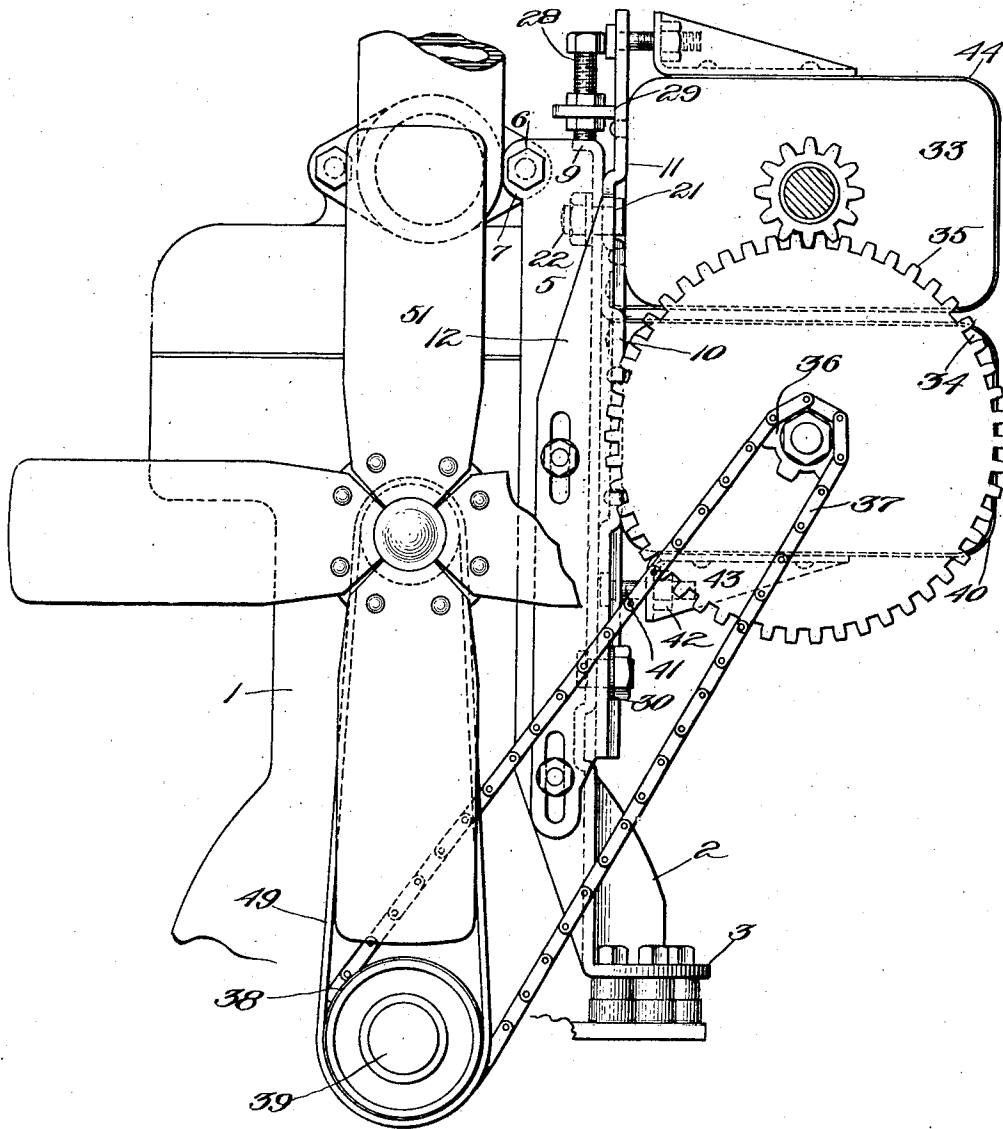


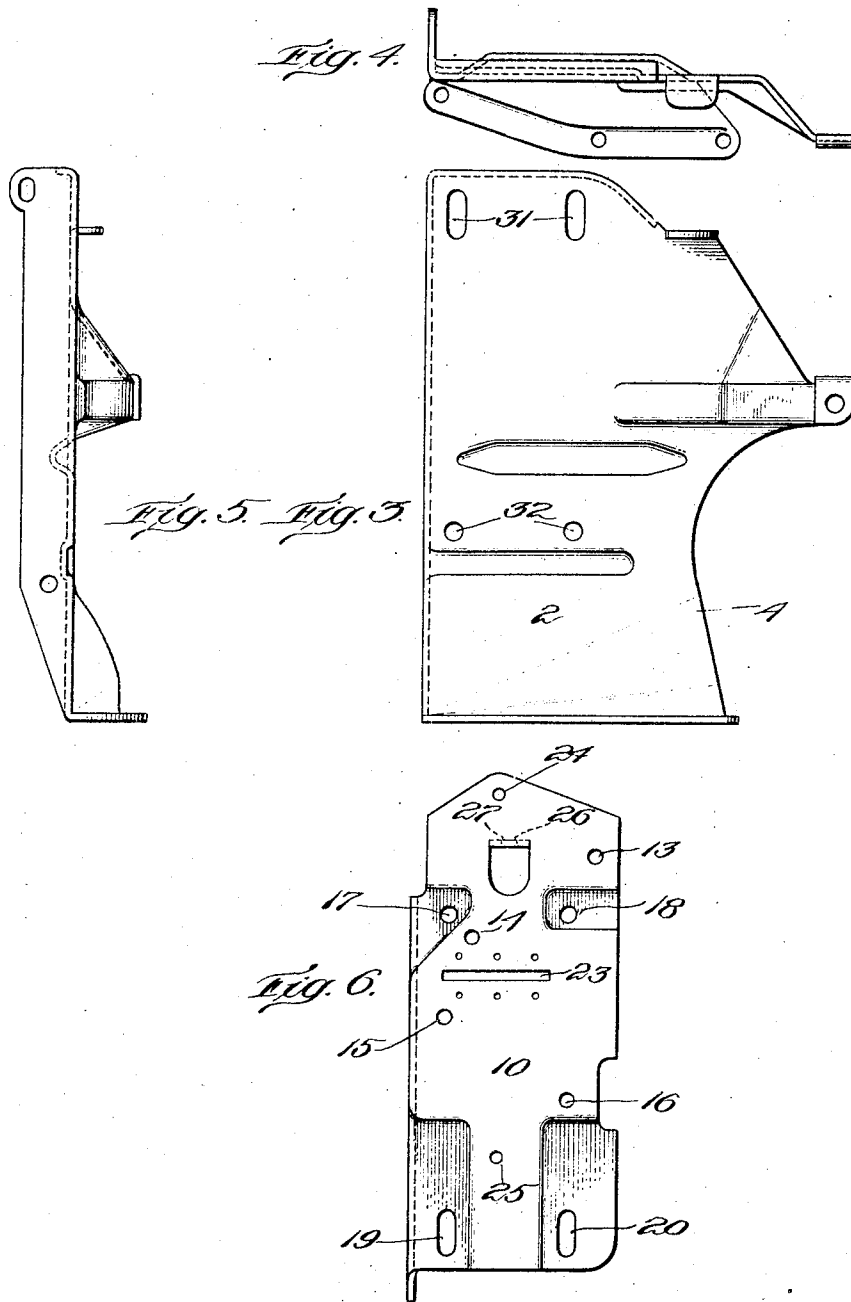
Fig. 2.

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UNITED STATES PATENT OFFICE.

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ELECTRIC STARTING AND LIGHTING APPARATUS FOR AUTOMOBILES.

1,380,113.

Specification of Letters Patent.

Patented May 31, 1921.

Application filed April 15, 1916. Serial No. 91,383.

To all whom it may concern:

Be it known that I, WILLIAM B. MOSES, a citizen of the United States, and resident of Brookline, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Electric Starting and Lighting Apparatus for Automobiles, of which the following is a specification.

This invention relates to electric starting and lighting apparatus for automobiles and with regard to certain more specific features thereof to the supporting means and devices for connecting the electrical unit or units with the engine.

One of the objects of the invention is to provide attaching devices of a simple, durable and inexpensive nature whereby the electrical units may be secured to the automobile quickly and conveniently and by relatively unskilled workmen.

Another object of the invention lies in the provision of devices whereby the electrical units may be readily and accurately located with respect to each other and relatively to their supporting means, thereby permitting several independent organizations to be co-operatively associated with a minimum of adjustment.

Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly consists in various features of construction, combinations of elements and arrangements of parts which will be exemplified by the construction hereinafter set forth and the scope of the application of which will be indicated by the following claims.

In the accompanying drawings wherein is illustrated one of various possible embodiments of the invention,

Figure 1 is a view in side elevation showing the invention.

Fig. 2 is a front elevation of Fig. 1.

Figs. 3, 4 and 5 are respectively front, side and top views of the main supporting bracket.

Fig. 6 is a front view of the auxiliary bracket.

Referring now more particularly to the drawings wherein similar reference characters refer to similar parts throughout the several views, there is indicated at 1 a portion of the engine casing of an automobile. The main bracket of the starting and lighting sys-

tem is designated at 2 and is provided with a foot 3 having bolt holes properly located to align with certain standard tapped holes in the engine casing flange. This bracket is formed with a substantially flat vertical plate or body 4 adapted to extend along the side of the engine casing and is provided with a ribbed or inturned portion 5 apertured at 6 to receive a bolt 7 whereby the bracket may be secured at its upper end to an ear extending from the water pipe or to some other suitable part of the engine. Various other points of attachment may be arranged, one of which is indicated at 8, the construction being such that the main bracket 2 is securely clamped to the engine using throughout or as far as possible bolt holes already provided therein. The main bracket is also formed with an inturn 9 along the top for purposes which will hereinafter appear.

An auxiliary bracket 10 is formed with a substantially flat wall 11 and an inturned side wall or rib 12, these walls being adapted for juxtaposition with the correspondingly named walls of the main bracket. Referring to Fig. 6 it will be noted that the auxiliary bracket 10 is provided with four dowel holes 13, 14, 15 and 16. Also at or near its upper portion it is provided with bolt holes 17 and 18 and near the bottom with slots 19 and 20 for the accommodation of attaching bolts as will presently appear. Depressions are formed in the bracket to receive heads 21 of the upper set of attaching bolts 22. A slot 23 is provided in the bracket 10 extending horizontally and adapted to receive the ends of two flexible metal straps which are riveted to said bracket and adapted to be carried respectively around the separate electrical units and secured at their outer ends by means of bolts passing through the bolt holes 24 and 25 formed in the bracket. An ear 26 is struck up from the bracket and provided with an aperture 27 through which extends an adjusting bolt 28. Lock nuts 29 are provided on the shank of the bolt 28 on opposite sides of the ear 26.

This auxiliary bracket is adjustably secured to the main bracket by means of an upper pair of bolts 22 and a lower pair of bolts 30. The shanks of the bolts 22 are disposed in bolt holes 17 and 18 in the auxiliary bracket and vertical slots 31 in the main bracket, while the shanks of the

bolts 30 are disposed in the vertical slots 19 and 20 in the auxiliary bracket and in bolt holes 32 in the main bracket. Relative adjustment of the two brackets is obtained
 5 by loosening the four bolts mentioned and screwing the adjusting bolt 28 in or out as desired. The necessary manipulation of the lock members 29 will be obvious.

The electrical units are indicated at 33 and
 10 34, the former being the starting motor and the latter the generator. Both of these units are provided with dowels which fit precisely in the dowel holes 13, 14, and 15, 16, thereby providing for definite and correct
 15 location of the units with respect to each other and with respect to the auxiliary bracket. Generator unit 34 is provided with a gear wheel 35 fixed on its armature shaft and also with a small sprocket 36 similarly
 20 mounted. A silent chain 37 connects the small sprocket 36 with a sprocket 38 fixed on a crank shaft 39 of the engine. Having introduced the dowels of the generator unit into their proper apertures in the auxiliary
 25 bracket, flexible strap 40, heretofore mentioned, is brought around the unit and secured by means of bolt 41 and a nut 42 to the auxiliary bracket. A lug 43 is riveted
 30 on to the free end of the strap 40 for strengthening purposes.

Similarly the motor unit 33 is fitted by its dowels to the auxiliary bracket and a flexible strap 44 identical with the strap 40 is
 35 carried around the unit to secure the latter in located position. The motor unit is provided with an armature shaft extension 45 which is threaded for a portion as indicated at 46 to automatically move the pinion 47
 40 longitudinally into and out of engagement with the gear 35 of the generator.

A pulley 48 is mounted on the crank shaft 39 and connects by means of a belt 49 with a fan pulley 50, the fan being indicated at 51. An electro-magnetic regulating device for governing the generator output is
 45 shown at 52 as mounted upon the motor unit. It will be obvious that if it is desired to remove the motor unit, as for purposes of repair, this regulating device may be
 50 temporarily mounted in the same relative position upon the generator unit. If it is desired only to install the generator part of the system the same brackets may be used, the regulator may be mounted as stated
 55 upon the generator unit, flexible strap 44 may have the lug of its free end screwed up tightly against the auxiliary bracket and the motor unit with its threaded shaft extension and pinion may be omitted.

60 In assembling and installing the present apparatus the auxiliary bracket 10 is attached to the main bracket 2 by means of bolts 22, 22, and 30, 30. Certain of the screw bolts of the engine are then removed
 65 and the main bracket fitted in place. The

same bolts or some slightly longer may be used to secure the parts in their located positions. The electrical units are then located in position by introducing the dowels into the proper dowel holes of the auxiliary
 70 bracket and the flexible straps are brought around each unit respectively and tautened to secure the units in their located positions. The generator unit carries the gear 35 and sprocket 36 as heretofore stated. The
 75 sprocket 38 and fan drive pulley 48 are mounted on the crank shaft of the engine or an extension thereof and these parts may be integral or separate as desired. The sprocket chain completes the transmission
 80 between the generator unit and the crank shaft. The motor unit is, of course, automatically located so that its armature shaft is correctly spaced from the armature shaft of the generator in order that the pinion 47
 85 may travel into and out of mesh with the gear wheel 35. It will be obvious that all that remains to be done in the way of adjustment is to vary the relative positions of the two brackets in order to correctly space
 90 the generator armature shaft from the crank shaft. This is accomplished by slightly loosening the bolts 22, 22, and 30, 30, and manipulating the adjusting screw 28 after which the said bolts are again
 95 tightened and the apparatus is in condition for use.

In operation, upon closure of the starting switch, the motor is energized from a storage battery (not shown) whereupon initial
 100 movement of the armature shaft of the motor unit moves the pinion 47 longitudinally into mesh with the gear 35 and against a stop 45. Continued movement of the motor armature shaft rotates the gear 35, the
 105 generator armature shaft and sprocket 36, which movement is imparted to the crank shaft through the chain 37 and sprocket 38. The engine is thereby given its initial starting or cranking movement and will commence to
 110 operate under its own fuel. By the latter condition the speed of the gear 35 is considerably increased over that which was imparted to it by the motor. This causes the pinion 47 to be urged longitudinally in an
 115 outward direction by the threaded portion 46 of the motor armature shaft extension until it is completely out of engagement with the gear 35. Means are provided for maintaining the pinion 47 in this outward
 120 position even although the starting switch is left closed, but the same form no part of the present invention and will not be particularly described. It is intended that at this point in the operation or prior thereto the
 125 operator should open the starting switch and it will be seen that the motor unit is thereby eliminated from any part in the operation of the system. The engine will at this time drive back through the shaft 39
 130

and the chain and sprocket connection to the generator armature shaft which continues to rotate and generate current to recharge the storage battery and furnish electrical energy to various transmitting devices in the system. Fan 51 is driven directly from the crank shaft and should it be desired to remove either the generator unit or the motor unit and their related transmission devices such removal will not affect the usual operation of the fan.

As many changes could be made in the above construction and as many apparently widely different embodiments of the invention might be made without departing from the scope thereof it is intended that all matter contained in the foregoing description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

Having described the invention what I desire to secure by Letters Patent is:

1. In engine starting and generating apparatus, in combination, a main bracket attached to an engine, an auxiliary bracket adjustably attached to said main bracket, a pair of separately detachable electric units thereon, a gear on one of said units adapted to engage and disengage a gear on the other of said units, and means automatically operative to cause relative shift of said gears into and out of said engagement.

2. In engine starting and generating apparatus, in combination, a main bracket attached to an engine, an auxiliary bracket adjustably attached to said main bracket, a pair of separately detachable units comprising a motor having an extended armature shaft with a pinion longitudinally shiftable thereon and a generator having an extended armature shaft with a gear fixed thereon, and means automatically operative whereby said pinion is caused to engage and disengage said gear.

3. In engine starting and generating apparatus, in combination, a main bracket attached to an engine, an auxiliary bracket attached thereto and slidably adjustable thereon, a pair of separately detachable electric units attached to said auxiliary bracket, and a longitudinally shiftable gear on one of said units adapted to engage and disengage a gear on the other of said units.

4. In apparatus of the character described, in combination, an engine, a main bracket attached to said engine, an auxiliary bracket detachably attached to said main bracket, an electric motor and a generator mounted thereon in juxtaposition and separately de-

tachable therefrom, a gear on the motor armature, a gear on the generator armature and means for shifting said gears into and out of mesh automatically.

5. In engine starting and generating apparatus, in combination, a main bracket attached to an engine, an auxiliary bracket adjustably attached to said main bracket, a pair of electric units adjacently mounted thereon, gearing on said units comprising an axially shiftable gear on one unit and a gear on the other unit, said gears being normally disengaged, and means automatically operative upon energization of one unit to axially shift the first said gear to establish a driving connection between the units.

6. In apparatus of the character described, the combination with an engine, of a pair of separately detachable electric units, a bracket adjustably mounted on the engine comprising means adapted to definitely locate said units relatively to each other and to said bracket, and means for securing the units in located positions.

7. In engine starting and generating apparatus, a bracket attachable in adjustably fixed relation to an engine, a pair of separately detachable electric units attached thereto, the attaching means comprising locating means for definitely fixing the relative positions of the units and a flexible strap for securing a unit in fixed position, and a longitudinally shiftable gear on one of said units adapted to move into and out of mesh with a gear on the armature shaft of the other unit.

8. In engine starting and generating apparatus, in combination, a main bracket attachable to an engine, an auxiliary bracket, means to secure said auxiliary bracket to said main bracket at different positions transversely of a driven part of the engine, a motor unit mounted on said auxiliary bracket, said motor unit having a pinion longitudinally shiftable thereon and rotatable therewith, a generator unit separately mounted on said auxiliary bracket and having a gear with which said pinion is adapted to mesh whereby the motor may drive said gear, and a chain and sprocket drive between the generator and engine driven part whereby the drive from the motor is imparted to said engine driven part.

Signed at Cambridge, in the county of Middlesex and State of Massachusetts, this eleventh day of April, A. D. 1916.

WILLIAM B. MOSES.