

June 26, 1928.

1,674,847

E. WATSON

ELECTRICALLY DRIVEN LAWN MOWER

Filed April 21, 1923

2 Sheets-Sheet 1

FIG. 1.

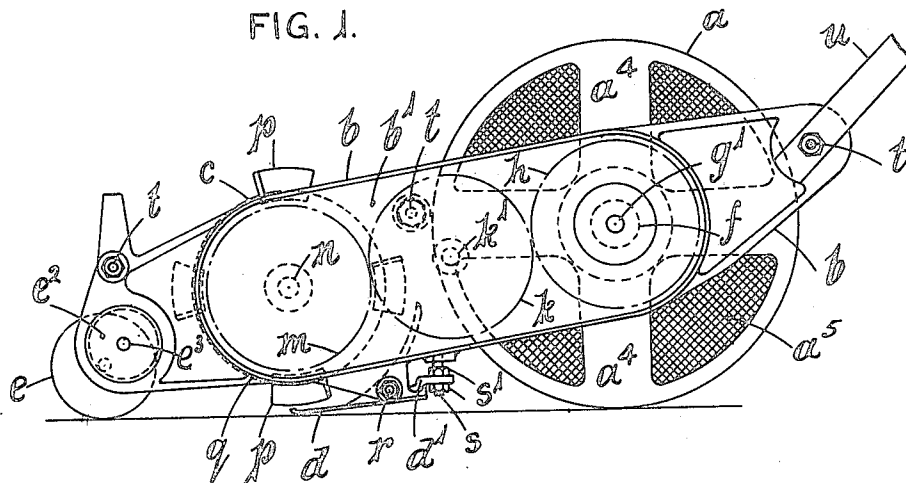
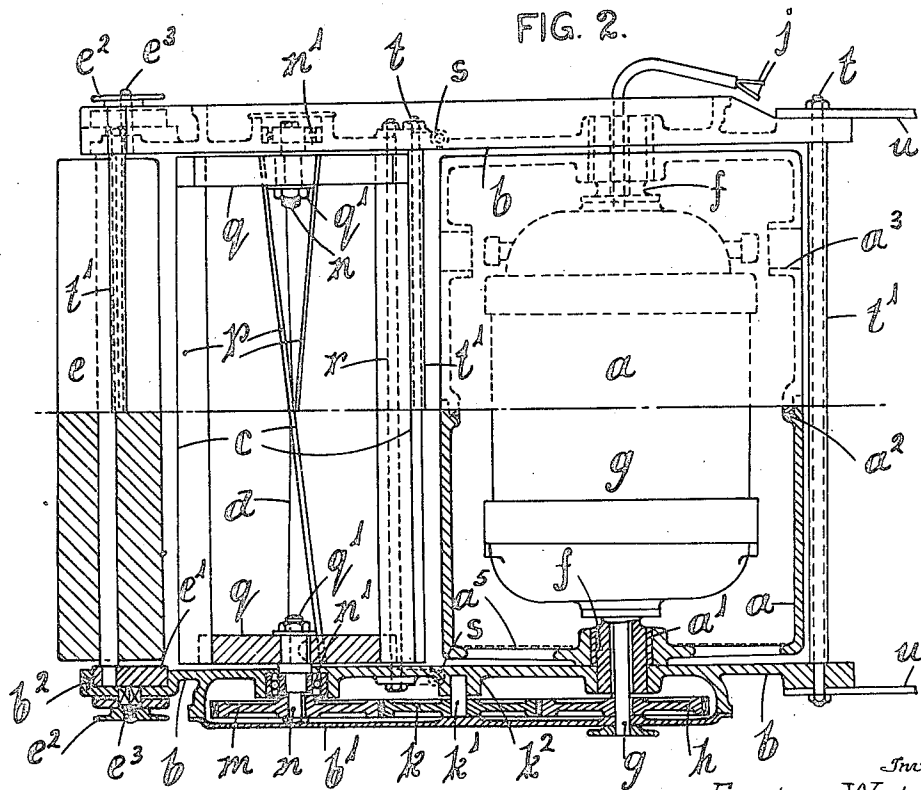


FIG. 2.



Inventor
Eustace Watson,

By *Toulmin & Paulmin,*

Attorneys

June 26, 1928.

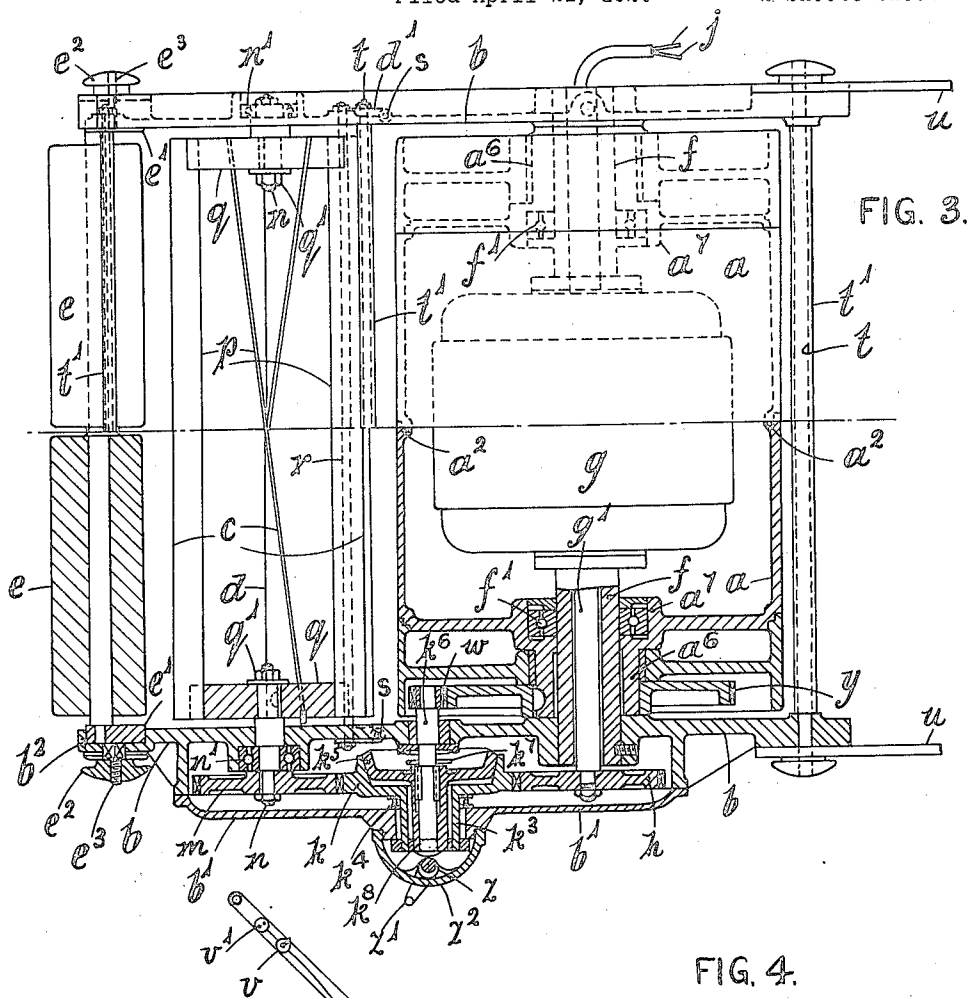
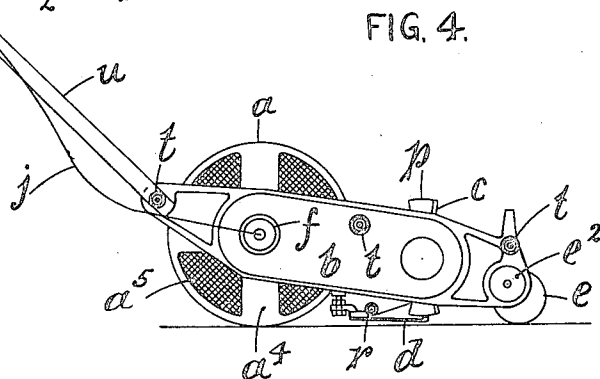
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2. Sheets-Sheet 2



Inventor

Eustace Watson,

By Paulmin Paulmin.

Attorneys

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UNITED STATES PATENT OFFICE.

EUSTACE WATSON, OF PONTELAND, ENGLAND, ASSIGNOR TO HENRY WATSON & SONS, LIMITED, OF NEWCASTLE-UPON-TYNE, ENGLAND.

ELECTRICALLY-DRIVEN LAWN MOWER.

Application filed April 21, 1926, Serial No. 103,498, and in Great Britain July 20, 1925.

This invention relates to electrically-driven lawn-mowers, and has for its object to provide a novel or improved arrangement and construction which can be readily and cheaply manufactured and assembled, and can be run off an ordinary domestic electric lighting system or other convenient supply of electric current.

In a lawn-mower in accordance with my invention, an electric motor is mounted within the land roller, said motor being of any convenient suitable type and being adapted to drive, through suitable gearing, the cutting cylinder, the current for operating said motor being taken from any convenient source of supply through a long flexible cable. According to a modification, the motor is adapted to also drive the land roller, a clutch or similar device being provided for throwing into and out of gear the drive to the land roller. The drive to the cutting cylinder is continuous while the motor is running, but the drive to the land roller in the modified construction is put into and out of operation when required.

The accompanying drawings illustrate lawn-mowers according to my invention, Figure 1 being a part elevation of one construction and Figure 2 a plan thereof, half in section. Figure 3 is a similar view to Fig. 2 illustrating a modified construction, and Figure 4 is a complete elevation of the machine of Figs. 1 and 2 to a smaller scale.

Referring first to Figs. 1, 2 and 4 of the said drawings, in the construction therein illustrated, the land roller *a* is mounted between a pair of metal side frames *b* which also carry between them the cutting cylinder *c*, the bottom blade *d* and the front roller *e*. The land roller *a* is revolvably mounted on bearing bushes *a*¹ on short hollow shafts *f* carried by the side frames *b* at each end of the roller, the ends of said hollow shafts within the roller being attached to the casing *g* of a motor arranged concentrically within the land roller *a*. At one end of the roller the rotary spindle *g*¹ of the motor extends through the hollow shaft *f* and is fitted externally of the roller with a pinion *h*. The motor spindle runs in suitable bearings carried by the ends of the motor casing as usual. At the other end of the land roller *a*, the cables *j* to the motor are led into the roller through the hollow shaft *f*. The roller *a* is transversely split cen-

trally of its length as shown at *a*² and its halves are retained in position, after assembly, by the side frames *b*. If desired, apertures *a*³ normally closed by removable plugs, may be provided in the periphery of the land roller in alignment with the brush gear of the motor to permit of adjustment of the brushes. At its ends the land roller is provided with radial arms *a*⁴, and the spaces between said arms are filled in with netting of fine mesh *a*⁵ which prevents the entry of cut grass and the like into the roller but allows the entry of air for cooling the motor.

In the construction illustrated in Figs. 1, 2 and 4 of the drawings, the motor drives the cutting cylinder *c* but does not drive the land roller *a*. The pinion *h* is coupled by an intermediate idler pinion *k* on a stud *k*¹ in a bearing *k*² in the frame *b* to a corresponding pinion *m* keyed on the short shaft *n* at one end of the cutting cylinder *c*. The gearing *h*, *k*, *m* is enclosed and protected by a dust-proof cover *b*¹. A suitable switch *v* (Fig. 4) for controlling the motor is provided on one of the shafts *u*, which is also fitted with a socket *v*¹ to receive a plug at the end of a long flexible cable which can be connected to the domestic lighting system or to any other convenient source of supply.

The cutting cylinder *c* may be provided with any convenient number of radially-projecting blades *p* coacting with the stationary bottom blade *d* which is vertically adjustable, being pivoted on a transverse rod *r* and provided with tail pieces *d*¹ engaging depending studs *s* carried by the frames *b*. By adjusting the nuts *s*¹ on the studs, the distance between the bottom blade *d* and the revolving blades *p* can be varied as required.

In the construction illustrated, the cutting blades *p* are inserted into radial slots around discs *q* mounted on the short shafts *n* of the cutting cylinder, thus providing a skeleton construction which is light and strong and leaves the centre of the cylinder free of obstruction thus affording an unimpeded outlet for cut grass. The shafts *n* run in ball-bearings *n*¹ carried by the frames *b*. The cutting cylinder can be readily detached by removing the cover *b*¹ and the nuts *q*¹ securing the discs *q* on the shafts *n* when these shafts can be withdrawn leaving the cylinder free.

The front roller e is mounted eccentrically of end discs e^1 which are housed in recesses b^2 formed in the side frames, and vertical adjustment of said roller is obtained by revolving said discs as required and then locking them against rotation by means of clamping nuts e^2 on studs e^3 on the discs e^1 , which studs are rotatable in the side frames.

The side frames b are held together by a number of tension rods t fitted with tubes t^1 forming distance pieces and disposed transversely of the machine.

The lawn-mower of Figs. 1, 2 and 4 is intended to be propelled by hand by the shafts u attached to the side frames b , but the machine may be driven or propelled by animal, electrical or other mechanical power, as may be desired.

Fig. 3 illustrates a similar construction wherein a drive from the cutting cylinder to the land roller is added. In this example, the land roller a is made in three sections, the central section containing the electric motor g . The central section rotates on ball-bearings f^1 about the hollow shafts f , and the end sections of the land roller are free to rotate independently of said central section and of each other on sleeves a^6 forming extensions of the housings a^7 of the bearings f^1 , said housings and sleeves being integral with the central section of the land roller.

The driving spindle g^1 of the motor g is provided with a driving pinion h which is coupled by the intermediate idler pinion k to a driven pinion m on the shaft n of the cutting cylinder c as in the construction of Figs. 1, 2 and 4, but in the present case the idler pinion k , which is carried by a hollow shaft k^3 mounted in a thrust bearing k^4 in the cover b^1 , is in the form of a clutch member, the complementary member k^5 of said clutch being keyed on a shaft k^6 extending through the shaft k^3 . On the inner end of the clutch shaft k^6 is a pinion w which gears with a pinion y on the sleeve a^6 of the central section of the land roller a . A spring k^7 around the shaft k^6 normally presses the clutch member k^5 into engagement with the complementary member k . The clutch member k^5 has a tubular extension k^8 extending through the hollow shaft k^3 , and coacting with the end of said extension k^8 is a cam z on a pivoted lever z^1 carried by a cap z^2 on the cover b^1 . By manipulating the lever z^1 , the cam z can be caused to disengage the clutch members k and k^5 against the action of the spring k^7 . When the clutch members are in engagement, the rotary power of the motor is transmitted therethrough to the clutch shaft k^6 , the pinion w thereon, the pinion y and the sleeve a^6 and hence to the central section of the land roller a which is thus driven simultaneously with but at a reduced speed to the cutting cylinder.

The end sections of the land roller revolve independently of the central section and facilitate turning of the machine.

It will be noticed that the drive to the cutting cylinder c is continuous while the motor g is running, while the drive to the central section of the land roller a can be put into and out of action at will.

What I claim as my invention, and desire to secure by Letters Patent is:—

1. An electrically-driven lawn-mower comprising a pair of side frames, a land roller, a cutting cylinder, a bottom blade and a front roller all mounted between said side frames, an electric motor mounted within said land roller, means for supplying said motor with electric current, and means for transmitting the rotary power of said motor to said cutting cylinder the drive of the cutting cylinder being independent of the rotation of the land roller.

2. An electrically-driven lawn-mower comprising a pair of side frames, a land roller, a cutting cylinder, a bottom blade and a front roller all mounted between said side frames, an electric motor mounted within said land roller, means for supplying said motor with electric current, means for transmitting the rotary power of said motor to said cutting cylinder, and means for transmitting said rotary power to said cutting cylinder and simultaneously to the land roller when desired.

3. An electrically-driven lawn-mower comprising a pair of side frames, a land roller, a cutting cylinder, an adjustable bottom blade and a front roller all mounted between said side frames, an electric motor mounted concentrically within said land roller, electric leads for supplying said motor with electric current, said land roller revolving freely on hollow shafts carried by said side frames, the spindle of said motor projecting through one of said hollow shafts and the electric leads to said motor entering through the other hollow shaft, and gearing between said spindle and said cutting cylinder whereby the rotary power of the motor is transmitted to the cutting cylinder.

4. An electrically-driven lawn-mower comprising a pair of side frames, a land roller, a cutting cylinder, an adjustable bottom blade and a front roller all mounted between said side frames, recesses in said side frames, and discs revolubly mounted in said recesses, said front roller being mounted eccentrically of said end discs, means for clamping said discs against rotation after adjustment, an electric motor mounted concentrically within said land roller, electric leads for supplying said motor with electric current, said land roller revolving freely on hollow shafts carried by said side frames, the spindle of said motor projecting through

one of said hollow shafts and the electric leads to said motor entering through the other hollow shaft, and gearing between said spindle and said cutting cylinder whereby the rotary power of the motor is transmitted to the cutting cylinder.

5 5. An electrically-driven lawn-mower comprising a pair of side frames, a land roller in a central section and two end sections side by side, a cutting cylinder, an adjustable bottom blade and a front roller all mounted between said side frames, recesses in said side frames, end discs revolubly mounted in said recesses, said front roller being mounted eccentrically of said end discs, means for clamping said discs against rotation after adjustment, an electric motor mounted concentrically within the central section of said land roller, electric leads for supplying said motor with electric current, sleeves connected to said central section, the end sections of said land roller revolving freely on said sleeves, hollow shafts carried by the side frames, the spindle of said motor projecting through one of said hollow shafts and the electric leads to the motor entering through the other hollow shaft, gearing between said spindle and the cutting cylinder whereby the rotary power of the motor is transmitted to the cutting cylinder, and means for transmitting the rotary power of the motor to the central section of the land roller when desired.

35 6. An electrically-driven lawn-mower comprising a pair of side frames, a land roller in a central section and two end sections side by side, a cutting cylinder, an adjustable bottom blade and a front roller all mounted between said side frames, recesses in said side frames, end discs revolubly mounted in said recesses, said front roller being mounted eccentrically of said end discs, means for clamping said discs against rotation after adjustment, an electric motor mounted concentrically within the central section of said land roller, electric leads for supplying said motor with electric current, sleeves connected to said central section, the end sections of said land roller revolving freely on said sleeves, hollow shafts carried by the side frames, the spindle of said motor projecting through one of said hollow shafts and the electric leads to the motor entering through the other hollow shaft, a pinion on said spindle, a pinion on the cutting cylinder, a hollow shaft intermediate of said pin-

ions, an idler pinion on said intermediate hollow shaft coupling said pinions together, said idler pinion forming one member of a clutch, an internal shaft within the hollow shaft of said idler pinion, a complementary clutch member on said internal shaft, a pinion on said internal shaft engaging a pinion on the sleeve connected to the central section of the land roller, and means for engaging at will said clutch members whereby the rotary power of the motor is transmitted to the central section of the land roller when desired.

70 7. An electrically-driven lawn-mower comprising a pair of side frames, a land roller in a central section and two end sections side by side, a cutting cylinder, an adjustable bottom blade and a front roller all mounted between said side frames, recesses in said side frames, end discs revolubly mounted in said recesses, said front roller being mounted eccentrically of said end discs, means for clamping said discs against rotation after adjustment, an electric motor mounted concentrically within the central section of said land roller, electric leads for supplying said motor with electric current, sleeves connected to said central section, the end sections of said land roller revolving freely on said sleeves, hollow shafts carried by the side frames, the spindle of said motor projecting through one of said hollow shafts and the electric leads to the motor entering through the other hollow shaft, a pinion on said spindle, a pinion on the cutting cylinder, a hollow shaft intermediate of said pinions, an idler pinion on said intermediate hollow shaft coupling said pinions together, said idler pinion forming one member of a clutch, an internal shaft within the hollow shaft of said idler pinion, a complementary clutch member on said internal shaft, a pinion on said internal shaft engaging a pinion on the sleeve connected to the central section of the land roller, a spring normally pressing the clutch members into engagement, a pivoted lever, and a cam thereon co-acting with one clutch member whereby said clutch members can be held apart when it is not desired to transmit the rotary power of the motor to the central section of the land roller.

In testimony whereof, I affix my signature.

EUSTACE WATSON.