Nov. 7, 1967 M. I. SHEPS ETAL 3,350,864

POWER-OPERATED LAWN TRIMMER-EDGER

Filed March 26, 1965 3 Sheets-Sheet 1

FIG. 1

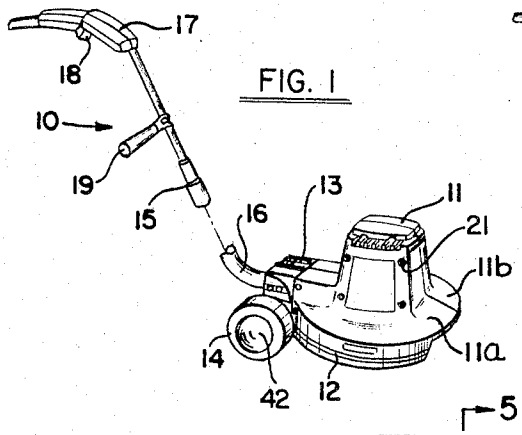


FIG. 2

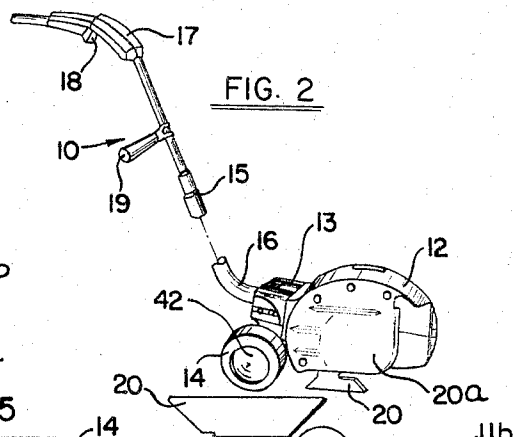


FIG. 3

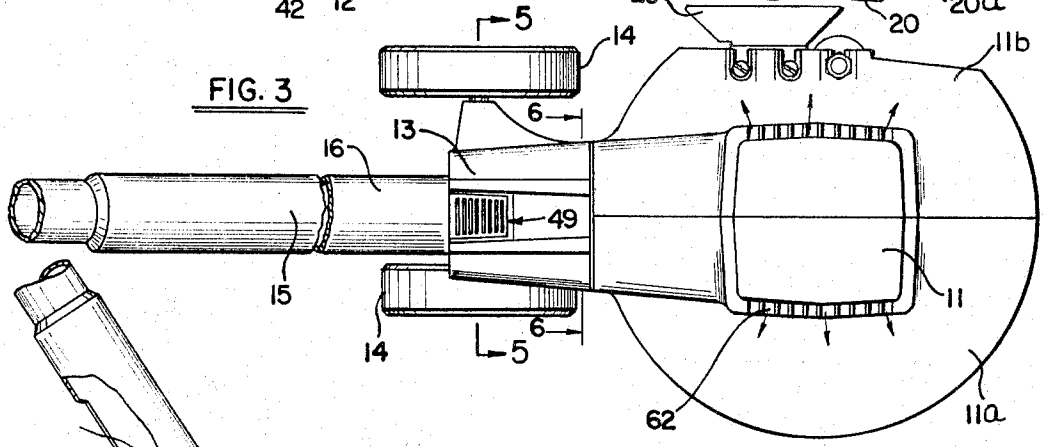


FIG. 4

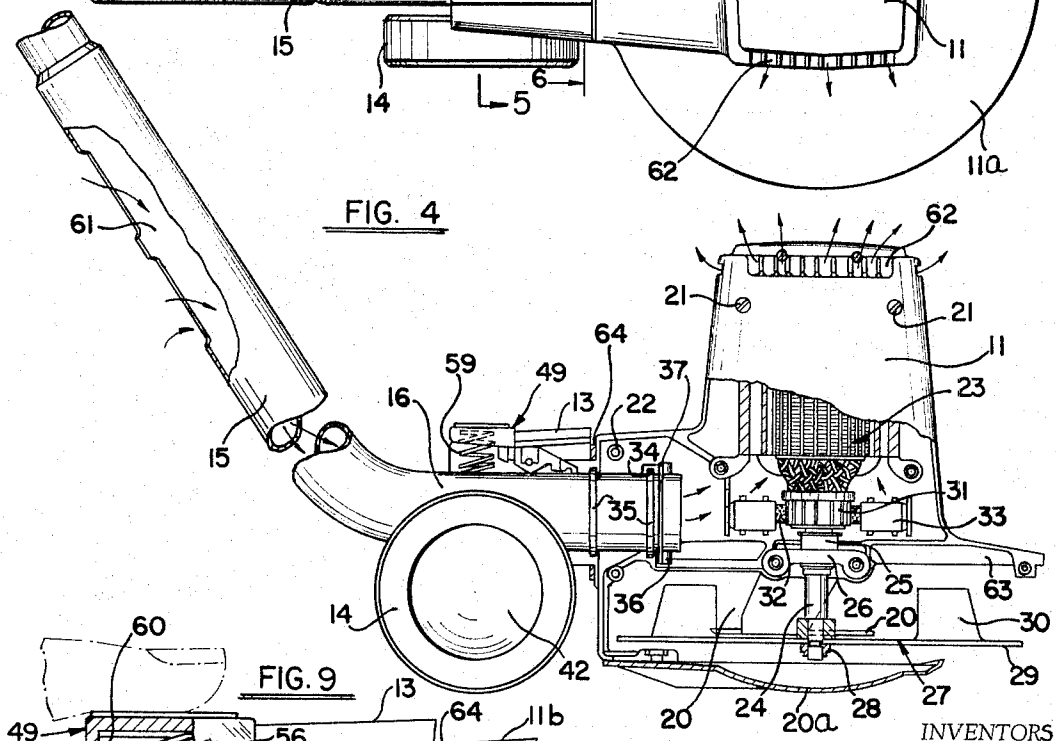
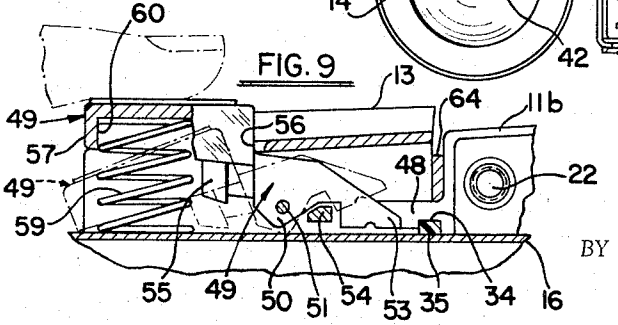


FIG. 9



INVENTORS
MARTIN I. SHEPS
MILLARD C. FITZGERALD, JR.
CLYDE W. SHUMAN, JR.

BY Leonard Bloom
ATTORNEY

Nov. 7, 1967 M. I. SHEPS ETAL 3,350,864

POWER-OPERATED LAWN TRIMMER-EDGER

Filed March 26, 1965 3 Sheets-Sheet 2

FIG. 5

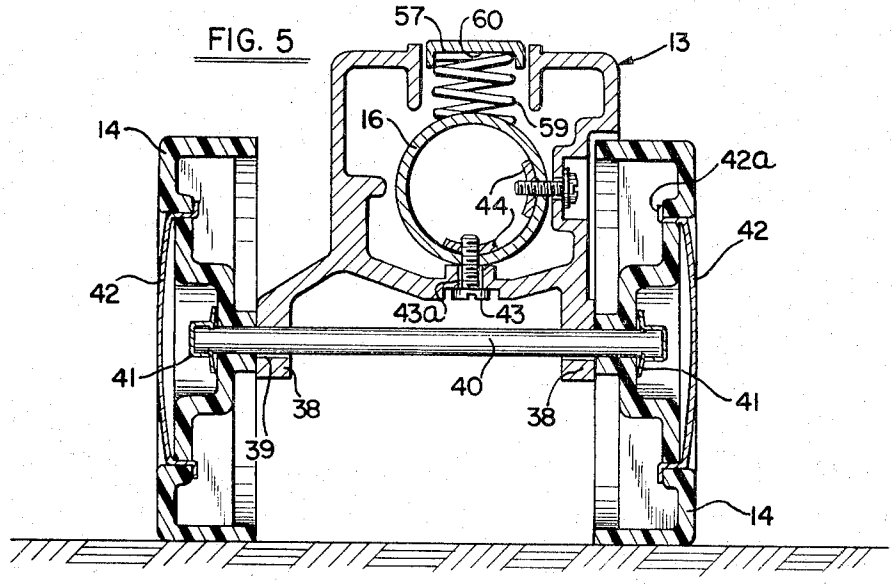


FIG. 10

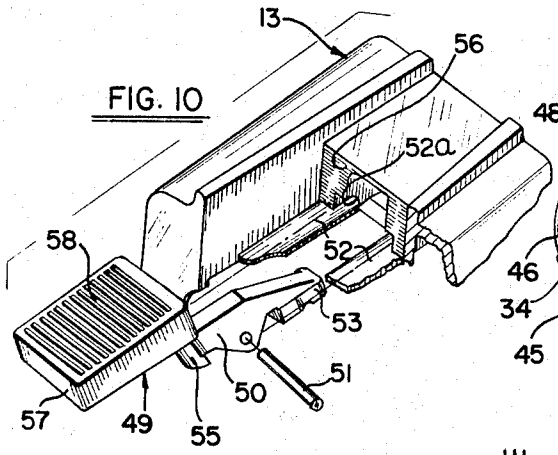


FIG. 7

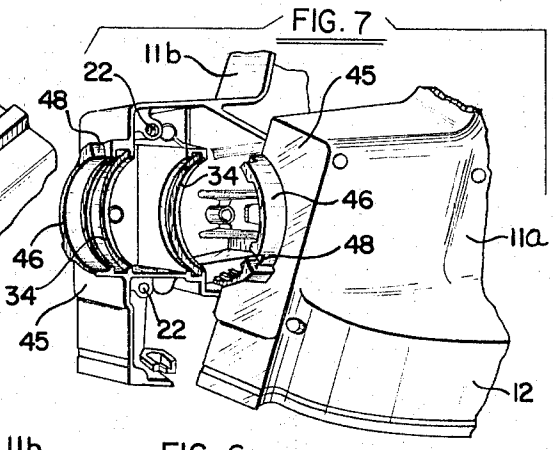


FIG. 8

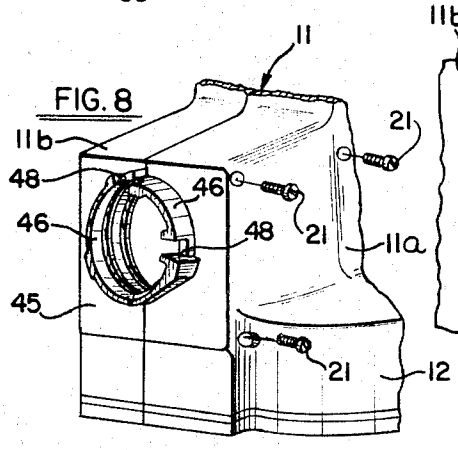
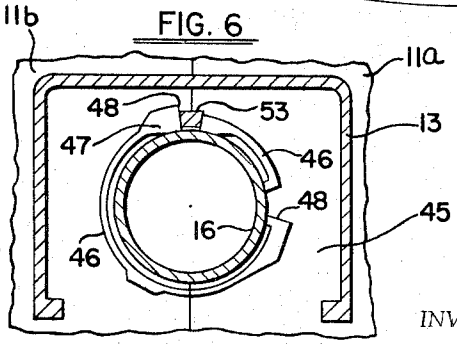


FIG. 6



INVENTORS

MARTIN I. SHEPS

MILLARD C. FITZGERALD, JR.

CLYDE W. SHUMAN, JR.

BY

ATTORNEY

Nov. 7, 1967 M. I. SHEPS ETAL 3,350,864

POWER-OPERATED LAWN TRIMMER-EDGER

Filed March 26, 1965 3 Sheets-Sheet 3

FIG. 11

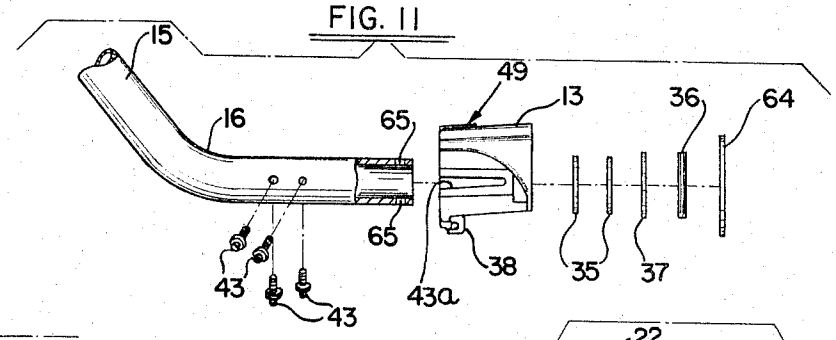


FIG. 12

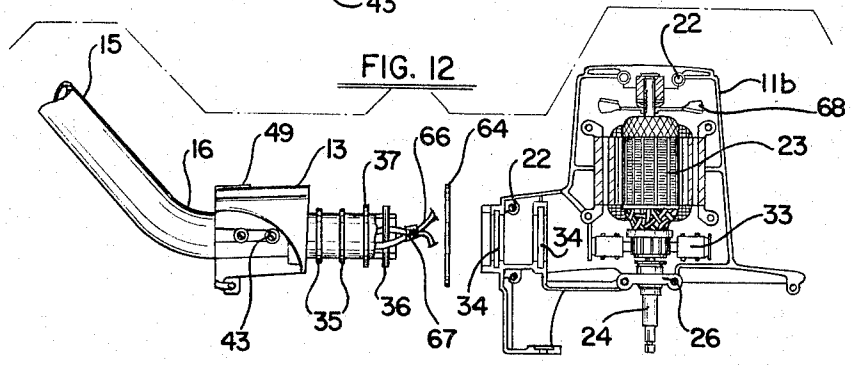


FIG. 13

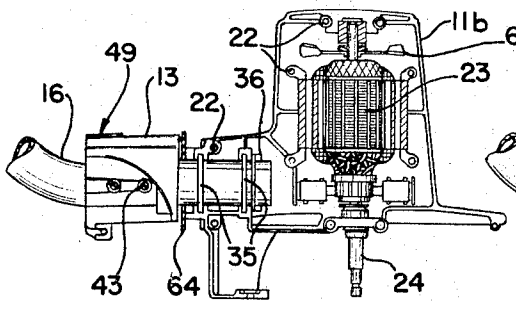


FIG. 14

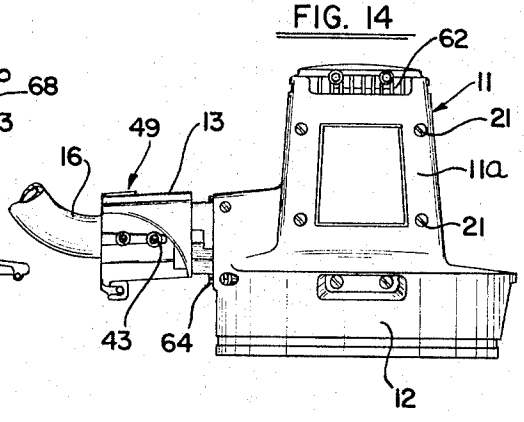
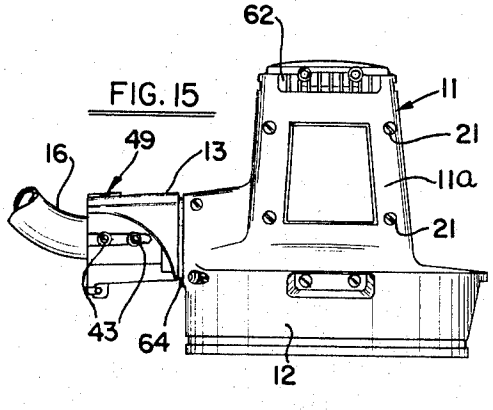


FIG. 15



INVENTORS

MARTIN I. SHEPS

MILLARD C. FITZGERALD, JR.

CLYDE W. SHUMAN, JR.

Leonard Bloom

ATTORNEY

United States Patent Office 3,350,864 Patented Nov. 7, 1967

3,350,864

POWER-OPERATED LAWN TRIMMER-EDGER

Martin I. Sheps and Millard C. Fitzgerald, Jr., Baltimore County, Md., and Clyde W. Shuman, Jr., State College, Pa., assignors to The Black & Decker Manufacturing Company, Towson, Md., a corporation of Maryland

Filed Mar. 26, 1965, Ser. No. 442,908
4 Claims. (Cl. 56—25.4)

ABSTRACT OF THE DISCLOSURE

An improved power-operated lawn trimmer-edger is herein disclosed. This trimmer-edger comprises a motor housing including a pair of complementary mating halves joined together along a common longitudinal midplane. A motor is retained between the complementary mating halves of the motor housing. This motor includes a shaft which projects below the motor housing and has a blade mounted thereon. A wheel housing is disposed rearwardly of the motor housing. A pair of ground-engaging wheels is carried by the wheel housing along an axis which is transverse to the common longitudinal midplane of the motor housing. An elongated handle has a bent cylindrical portion which is rigidly secured to the wheel housing, and which projects forwardly therefrom into the motor housing. Means are provided for journaling this forwardly projecting handle portion in the motor housing. This journaling means includes at least one ring of anti-friction material which is disposed between the forwardly projecting handle portion and the complementary mating halves of the motor housing. A stop is formed integrally on each of the mating halves; these stops are circumferentially spaced, approximately at right angles to each other. A resiliently biased index latch is carried by the wheel housing and selectively engages one of the integrally formed stops, thereby selectively indexing the motor housing (and hence the blade) relative to the wheel housing and the ground-engaging wheels, and thereby facilitating a lawn-trimming or lawn-edging operation, selectively.

Preferably, each of the complementary mating halves of the motor housing has a pair of spaced-apart semi-annular grooves formed therein. The grooves in one half cooperate with those in the other half to form a pair of spaced-apart aligned annular seats, the axis of which is substantially within the common longitudinal midplane. Each of these annular seats receives a ring of anti-friction material, disposed radially betwen the handle portion and the motor housing, thereby journaling the handle portion in the motor housing, and thereby preventing dirt from entering into the motor housing.

Further, and preferably, each of the mating halves has a rear wall formed with a rearwardly extending semi-annular rib. The rib on one half cooperates with the rib on the other half to form a rearwardly extending index collar enclosed by the wheel housing. The circumferentially spaced stops are then formed integrally on this index collar, and as noted above, cooperate with the resiliently biased index latch carried by the wheel housing.

Objects of the invention

The objects of the invention are to provide an improved power-operated lawn trimmer-edger having an economical construction and arrangement of parts, one which is rugged and reliable for continuous duty, and one which may be quickly and conveniently adjusted for either lawn-edging or lawn-trimming operations.

These and other objects of the present invention will become apparent from a reading of the following specification, taken in conjunction with the enclosed drawings, in which:

Description of the drawings

FIGURE 1 is a perspective of the power-operated trimmer-edger machine of the present invention, the machine being positioned for a lawn trimming operation;

FIGURE 2 is a perspective of the machine positioned for a lawn edging operation;

FIGURE 3 is an enlarged fragmentary top plan view of the machine shown in FIGURE 1, the elongated handle being broken away for convenience of illustration;

FIGURE 4 is a side elevation of the machine shown in FIGURE 3, with part of the longitudinally split motor housing being broken away to illustrate the general construction of the machine and the specific manner in which the pivoted latch member is mounted within the wheel housing for engagement with the stop means on the index collar formed by the motor housing;

FIGURE 5 is an enlarged transverse section, taken along the lines 5—5 of FIGURE 3, and illustrating, first, the manner in which the ground-engaging wheels are mounted on a transverse axle carried by the wheel housing; secondly, the manner in which the wheel housing is secured to the bent cylindrical portion of the elongated handle; and thirdly, the manner in which the pivoted latch member is resiliently biased by a spring retained between the latch member and the handle;

FIGURE 6 is an enlarged transverse section, taken along the lines 6—6 of FIGURE 3, and showing the cooperative engagement between the pivoted latch member and the stop means formed on the rearward index collar of the motor housing;

FIGURE 7 is a partial exploded perspective of the rear portion of the respective complementary mating halves of the longitudinally split motor housing, showing the manner in which the index collar is formed by cooperating semi-annular ribs on the respective mating halves of the motor housing;

FIGURE 8 corresponds substantially to that of FIGURE 7, but illustrates the complementary mating halves secured together;

FIGURE 9 is an enlarged portion of FIGURE 4, showing the details in the construction of the pivoted latch member and its retention within the wheel housing;

FIGURE 10 is a partial perspective of the rear portion of the wheel housing, the casing being broken away to illustrate the manner in which the pivoted latch member is inserted and assembled within the wheel housing; and

FIGURES 11–15 illustrate the sequential assembly of the major components of the machine.

With reference to FIGURES 1 and 2, there is illustrated a power-operated lawn trimmer-edger machine **10** which embodies the teachings of the present invention. This machine **10** generally comprises a motor housing **11** including a pair of complementary mating halves **11***a* and **11***b* detachably secured together along a common longitudinal midplane, a peripheral skirt **12** formed along the bottom edges of the motor housing, a wheel housing **13** disposed rearwardly of the motor housing, a pair of ground-engaging wheels **14** carried by the wheel housing, an elongated handle **15** having a bent cylindrical portion **16** secured to the wheel housing, an upper control handle **17** provided with a trigger switch **18**, an auxiliary hand grip **19** to facilitate the manual guidance and control of the machine, an edging guide **20**, and a skid plate **20***a*, the latter being shown in FIGURE 2.

With reference to FIGURES 3 and 4, the mating halves **11***a* and **11***b* of the motor housings are detachably secured together by a plurality of screws **21** which are received within recesses **22** formed in the "bottom" mating half **11***b*. An electric motor, generally denoted as at **23**, is retained between the mating halves **11***a* and **11***b* of the motor housing. The motor has a driving shaft **24** which

is journaled in a bearing **25**, and the bearing is retained by means of a strap **26** secured to the bottom mating half **11***b*. A rotary blade **27** is secured to the driving shaft **24** by means which includes a lock nut **28**, and the blade **27** rotates within the peripheral skirt **12** and below a transverse wall **63** formed between the complementary mating halves **11***a* and **11***b* of the longitudinally-split motor housing. The blade is preferably formed as an oblong bar **29** with integrally-formed scoops **30** which assist in the lawn-edging operation of the machine; more specifically, the scoops **30** are adapted for scooping away the grass and/or dirt overlying the sidewalk adjacent to the lawn. The details of the blade construction, however, form no part of the present invention, but rather are described in the co-pending Fitzgerald application Ser. No. 435,143, filed February 25, 1965, entitled "Blade for Lawn Edger," and assigned to the assignee of the present invention.

With reference again to FIGURES 3 and 4, the electric motor **23** is provided with a commutator **31** engaged by electrical brushes **32** mounted in respective brush holders **33**. Preferably, the brush holders are trapped between the complementary mating halves **11***a* and **11***b* of the motor housing. The bent cylindrical portion **16** of the elongated handle, which is secured to the wheel housing **13**, is received rearwardly within the motor housing **11** and is journaled between the complementary mating halves **11***a* and **11***b*. In this manner, the motor housing **11** is rotatably journaled relative to the wheel housing **13** about an axis which is substantially within the common longitudinal midplane between the complementary mating halves of the longitudinally split motor housing **11**.

Preferably, each of the mating halves **11***a* and **11***b* is provided with a pair of integrally-cast semi-annular grooves **34**, see FIGURE 4 again; and it will be appreciated that when the mating halves **11***a* and **11***b* are joined together, the semi-annular grooves **34** cooperate with one another to form a pair of axially-spaced annular bearing seats. A pair of rings **35** (formed from an anti-friction material) are slidably mounted upon the bent cylindrical portion **16** of the elongated handle and are received within the respective bearing seats formed by the cooperating semi-annular grooves **34**. Preferably, the rings **35** are formed from a molded plastic material which is readily deformable so as to compensate for any misalignments or tolerance accumulations between the handle portion **16** and the longitudinally split motor housing **11**. In this manner, the rings serve the dual function of bearing journal members and an economical means to compensate for tolerance accumulations. The details of the rings **35** form no part of the present invention, but rather are described in the copending Sheps application Ser. No. 437,030, filed March 4, 1965, entitled "Combination Tolerance Ring and Bearing Journal Member," and assigned to the assignee of the present invention.

A roll pin **36**, see FIGURE 4 again, is received transversely of the handle portion **16**, and the roll pin **36** (together with a washer **37** bearing against one of the semi-annular grooves **34**) prevents the axial withdrawal of the handle portion **16** from the motor housing.

With reference to FIGURE 3 again and with further reference to FIGURE 5, the wheel housing **13** has a pair of depending ears **38** having respective bores **39** alined with each other to form a journal for an axle **40**. The axle **40** is positioned transversely of the common longitudinal midplane between the complementary mating halves **11***a* and **11***b* of the motor housing. The wheels **14** are mounted on the respective ends of the axle **40** and are retained by respective push-on caps **41**. Preferably, a cover member **42** is secured to each of the wheels by tangs **42***a*. As shown in FIGURE 5, the bent cylindrical portion **16** of the elongated handle is secured to the wheel housing **13** by means of pairs of screws **43** which pass through respective slots **43***a* in the wheel housing. The screws **43** engage respective tapped recesses formed within clamping plates **44** retained within the handle portion **16**.

With reference to FIGURES 7 and 8, each of the mating halves **11***a* and **11***b* of the longitudinally-split motor housing has a rearward wall **45** formed with an integrally-cast semi-annular rib **46**. When the mating halves **11***a* and **11***b* are joined together, as shown in FIGURE 8, the ribs **46** form a rearwardly-extending index collar **47** having a pair of circumferentially-spaced stops **48** formed thereon.

With reference to FIGURES 9 and 10, a latch member **49** is retained within the wheel housing **13**. The latch member **49** has its intermediate portion **50** pivotably supported by means of a pin **51**. The pin **51** is guided within a pair of slots **52** cast integrally within the wheel housing **13**. The guide slots **52** have respective ends **52***a* which form abutments for the laterally-extending ends of the pivot pin **51**. The latch member **49** has a forwardly-extending latching portion **53** adapted to engage the stop means **48** formed on the index collar **47** of the motor housing, as shown more particularly in FIGURE 6. A transverse retaining bridge **54** is formed integrally within the wheel housing **13** and is nested between the forwardly-extending latching portion **53** of the latch member **49** and its pivotably-supported intermediate portion **50**. The latch member **49** has a rearward depending stop element **55**, see FIGURE 9, which engages the bent cylindrical portion **16** of the elongated handle to limit the pivotable movement of the latch member **49** about its pin **51**. The stop element **55**, together with the retaining bridge **54**, prevent the withdrawal of the latch member **49** from the wheel housing **13** subsequent to the insertion of the handle portion **16** within the wheel housing **13**. The wheel housing has an access opening **56**, and the latch member **49** has a rearward manually manipulatable portion **57** which extends through the access opening **56**. The exposed top surface of the rearward portion **57** of the latch member **49** is formed with a plurality of serrations **58**, as shown in FIGURES 3 and 10, to facilitate its manual manipulation. A compression spring **59**, see FIGURE 5, is lodged between the handle portion **16** and a recess **60** formed within the rearward portion **57** of the latch member. The spring **59** constantly urges the latch member **49** into indexing engagement with the stop means **48** formed on the index collar **47** carried by the motor housing **11**.

The latch member **49**, as shown in FIGURE 9, may be pivoted so as to release its latching portion **53** from engagement with the stop means **48** on the motor housing, and thereafter the entire motor housing **11** may be pivoted about the axis of the bent cylindrical portion **16** of the elongated handle. In this manner, the machine **10** may be positioned for either a lawn-edging or a lawn-trimming operation. The details of the pivoted index latch member **49** form no part of the present invention, but rather are described more particularly in the co-pending Shuman application Ser. No. 443,131, filed March 26, 1965, now Patent No. 3,330,102, entitled "Pivoted Index Latch for Lawn Trimmer-Edger," and assigned to the assignee of the present invention.

As shown in FIGURE 4, the elongated control handle **15** has a plurality of air inlet apertures **61**, and cooling air is drawn into the apertures **61** and passes down through the tubular cylindrical portion **16** of the handle and into the motor housing **11**, where the cooling air is discharged through air exhaust apertures **62** formed in the upper portion of the motor housing. The air is drawn into the motor housing by means of a cooling fan **68**, see FIGURES 12 and 13, which is carried on the upper portion of the motor shaft. The air flow is away from the transverse wall **63** formed between the mating halves of the motor housing. The manner in which the air is drawn in through the tubular elongated handle and is expelled out of the motor housing is considered quite old in the art and forms no part of the present invention.

With reference to FIGURES 11–15, the sequential assembly of the trimmer-edger machine **10** of the present

invention may be more easily understood. The bent cylindrical portion **16** of the elongated handle is received within the wheel housing **13**. The screws **43**, see FIGURE 5, are loosely seated in the respective tapped recesses in the clamp plates **44**, the screws passing through the elongated slots **43***a* formed in the wheel housing **13**. The molded plastic rings **35**, the washer **37**, and a large outer washer **64** are received on the portion of the bent cylindrical handle **16** forwardly of the wheel housing **13**. The transverse roll pin **36** is assembled within alined apertures **65** formed in the handle portion **16**, as shown in FIGURE 11. The electrical leads **66** (which are disposed within the elongated tubular handle **15**) are brought through the handle portion **16**, see FIGURE 12, and are tied together around the roll pin **36** and are retained by a tape **67** or other suitable means. This subassembly of the handle portion **16**, the wheel housing **13**, the rings **35**, the washer **37**, and the roll pin **36**, is placed and seated within the bottom mating half **11***b* of the longitudinally-split motor housing, as shown in FIGURE 13. Preferably, the handle portion **17** will be pushed slightly ahead within the bottom mating half **11***b*, such that the washer **37** is loosely disposed with respect to the sides of its adjacent semi-annular groove **34**. The rings **35**, however, are seated within their respective grooves **34**. The top mating half **11***a* of the motor housing is then placed over the bottom mating half **11***b* and is secured thereto by screws **21**. The outer washer **64**, see FIGURE 14, is then placed over the index collar **47** of the longitudinally-split motor housing, thereby keying the housing members **11***a* and **11***b* together. Thereafter, the handle portion **16** is moved rearwardly such that the washer **37** (adjacent to the roll pin **36**) is tightly received against its adjacent annular bearing seat formed by the cooperating grooves **34**. Finally, as shown in FIGURE 15, the wheel housing **13** is moved forwardly such that it encloses the index collar **47** and is brought up against the outer washer **64**. Thereafter, the screws **43** may be tightened to complete the assembly.

Obviously, many modifications may be made without departing from the basic spirit of the present invention; and accordingly, within the scope of the appended claims, the invention may be practiced other than has been specifically described herein.

We claim:

1. In a power-operated lawn trimmer-edger having a motor housing and further having an elongated handle formed with a cylindrical handle portion received within the motor housing, the improvement in means to rotatably journal the handle portion within the motor housing, which comprises:

(a) said motor housing including a pair of complementary mating halves joined together along a common longitudinal midplane;

(b) each of said mating halves having a pair of spaced-apart semi-annular grooves formed therein;

(c) the grooves in one half cooperating with those in the other half to form a pair of spaced-apart alined annular seats, the axis of which is substantially within the common longitudinal midplane;

(d) a ring of anti-friction material received in each of said seats, radially between the handle portion and the motor housing, thereby journaling the handle portion in the motor housing; and

(e) means selectively indexing the motor housing in at least two predetermined circumferential positions relative to the handle.

2. In a power-operated lawn trimmer-edger having a motor housing, a wheel housing rearwardly of the motor housing, an elongated handle having a portion secured to the wheel housing, and means mounting the wheel housing and the motor housing for relative rotation therebetween, the improvement in means to selectively index the motor housing and the wheel housing with respect to each other, which comprises:

(a) said motor housing including a pair of complementary mating halves joined together along a common longitudinal midplane;

(b) each of said mating halves having a rear wall formed with a rearwardly-extending semi-annular rib;

(c) the rib on one half cooperating with the rib on the other half to form a rearwardly-extending index collar enclosed by said wheel housing;

(d) circumferentially-spaced stop means formed on said index collar; and

(e) a resiliently-biased index latch pivotably mounted on said wheel housing on an axis transverse to the common longitudinal midplane for selective engagement with said stop means on said index collar, thereby selectively indexing said wheel housing with respect to said motor housing.

3. A power-operated lawn trimmer-edger, comprising:

(a) a motor housing including a pair of complementary mating halves joined together along a common longitudinal midplane;

(b) a motor retained between said complementary mating halves of said motor housing; said motor including a shaft projecting below said motor housing and having a blade mounted thereon;

(c) a wheel housing rearwardly of said motor housing;

(d) a pair of ground-engaging wheels carried by said wheel housing along an axis transverse to said common longitudinal midplane of said motor housing;

(e) an elongated handle having a bent cylindrical portion rigidly secured to said wheel housing and projecting forwardly therefrom into said motor housing;

(f) means journaling said forwardly projecting handle portion in said motor housing; said journaling means including at least one ring of anti-friction material disposed between said forwardly projecting handle portion and said complementary mating halves of said motor housing;

(g) a stop formed integrally on each of said mating halves; said stops being circumferentially spaced, approximately at right angles to each other; and

(h) a resiliently biased index latch carried by said wheel housing and selectively engaging one of said integrally formed stops, thereby selectively indexing said motor housing, and hence said blade, relative to said wheel housing and said ground-engaging wheels, and thereby facilitating lawn-trimming or lawn-edging operations, selectively.

4. The power-operated lawn trimmer-edger of claim **3**, wherein:

(a) said ring of anti-friction material is mounted on said forwardly projecting handle portion; and wherein:

(b) each of said complementary mating halves of said motor housing has a semi-annular groove formed therein, the groove in one half communicating with the groove in the other half to form an annular seat receiving said ring.

References Cited

UNITED STATES PATENTS

2,815,049	2/1957	Herscovitch	143—43.50
3,033,312	5/1962	Enders	184—5
3,221,481	12/1965	Mattson et al.	56—25.4

ABRAHAM G. STONE, *Primary Examiner.*

P. A. RAZZANO, *Assistant Examiner.*