

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

One World Technologies, Inc. D/B/A Techtronic Industries Power Equipment,
Petitioner,

v.

CHERVON (HK) LIMITED,
Patent Owner.

Case IPR2020-00886

U.S. Patent No. 9,826,686
Issue Date: November 28, 2017
Title: Gardening Tool

DECLARATION OF E. SMITH REED

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(WO2013/122266A2).....64

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EXHIBITS

TTI1001: U.S. Patent No. 9,826,686 (“the ’26686 patent”)

TTI1002: Prosecution History of the ’26686 Patent (“Prosecution History”)

TTI1003: Declaration of E. Smith Reed

TTI1004: U.S. Patent No. 3,253,391 (“Meldahl”)

TTI1005: Reserved

TTI1006: U.S. Patent No. 8,098,036 (“Matsunaga”)

TTI1007: GB 2,386,813 (“Reichart”)

TTI1008: 16 CFR Part 1205 – Safety Standard for Walk-Behind Power Lawn
Mowers (January 1, 2012)

TTI1009: U.S. Patent No. 1,899,564 (“Frey”)

TTI1010: U.S. Patent No. 2,702,448 (“Smith”)

TTI1011: U.S. Patent No. 4,753,062 (“Roelle”)

TTI1012: U.S. Patent No. 5,209,051 (“Langdon”)

TTI1013: FR 2,768,300 original French language

TTI1014: FR 2,768,300 certified English translation (“Outils”)

TTI1015: WO2013/122266 A2 (“Nakano”)

TTI1016: Reserved

TTI1017: Reserved

TTI1018: Reserved

TTI1019: Prosecution History of U.S. Patent 9,596,806

TTI1020: CN202019551U certified English translation

TTI1021-1029: Reserved.

TTI1030: ANSI/OPEI B71.1-2003 (updated version ANSI/OPEI B71.1-2012
revised/issued April 23, 2012) (“ANSI B71.1”)

I, E. Smith Reed, P.E., hereby declare as follows:

I. INTRODUCTION

1. My name is Edward Smith Reed. I am a Machine and Product Design Engineer Consultant at E. Smith Reed, P.E., PLLC of Fairlee, Vermont, a successor company of Reed Engineering Consultants, Inc. of Hanover, New Hampshire.

2. I have been retained as an expert witness on behalf of One World Technologies, Inc., d/b/a Techtronic Industries Power Equipment for the above-captioned Petition for Inter Partes Review (“IPR”) of claim 1 (“the Challenged Claim”) of U.S. Patent No. 9,826,26686 (“the '26686 patent”). I am being compensated for my time in connection with this IPR at my standard consulting rate of \$320 per hour. My compensation is in no way dependent on the outcome of this matter.

3. In this declaration, I provide my opinions based on the skill person’s understanding of features described in this patent. In forming the opinions expressed in this declaration, I relied upon my education and experience in the relevant field of the art, and have considered the viewpoint of a person having ordinary skill in the relevant art, as of 2012. My opinions directed to the invalidity of the Challenged Claims are based, at least in part, on the publications identified

in the Petition and discussed further below, which I have been instructed by Petitioner's counsel constitute prior art.

II. BACKGROUND AND QUALIFICATIONS

4. I have a Bachelors of Science degree in Mechanical Engineering (BSME) from the University of Arkansas (1968). I am a Licensed Registered Professional Engineer, licensed in the United States in the states of Vermont, New Hampshire and Minnesota. I have over 25 years of industry-related engineering experience, including experience designing products, including outdoor power turf maintenance products (power lawn mowers and turf care equipment), and experience as a manufacturing and industrial engineer. My experience includes the design and redesign of walk-behind and riding lawnmowers, as detailed below. My Professional Engineering licenses (my P.E. licenses) are specifically in the three fields of Mechanical Engineering, Manufacturing Engineering and Industrial Engineering. I am the owner of E. Smith Reed, P.E., PLLC, a company engaged in engineering consulting based in Fairlee, Vermont.

5. In earning my BS degree in Mechanical Engineering, included in the courses I completed were such subjects as Physics, Statics, Dynamics, Calculus, and Differential Equations, and upper-level courses that included Metallurgy, Manufacturing Processes, Casting and Welding, Fluid Mechanics,

Thermodynamics, Heat Transfer, Aerodynamics, Electrical Engineering Circuits, Aircraft Engines, Probability & Statistics, Dynamics of Machinery, and Machine Design. In addition, I am a Board Certified Diplomat in Forensic Engineering, certified through the National Academy of Forensic Engineers in accordance with the requirements and guidelines set forth by and accredited by the Council of Engineering and Scientific Specialty Board (CESB). I am a named inventor on four U.S. Patents, two of which are directly related to and used in the lawn and garden industry.¹ A complete Curriculum Vitae is attached as Exhibit A.

6. I am a member of or a long-term past member of several engineering societies, societies devoted to the promotion of the art and science of engineering in their particular field. Among the societies I have been or am a member of are the American Society of Mechanical Engineers, the Society of Automotive Engineers, the American Society of Agricultural and Biological Engineers, the Society of Manufacturing Engineers and the American Society for Quality. These societies develop, collect, publish and distribute engineering information related to their fields of interest. As a member of these particular societies, on a regular basis, I have been provided with and I have taken advantage of the availability of technical papers, standards, engineering practices and data related to the fields of,

¹ U.S. Patent No. 3,939,917, and 4,191,007.

among others, mechanical engineering, outdoor powered equipment, lawn and garden equipment, construction-related machinery and farm and agricultural machinery.

7. From 1970 to 1979, I held the positions of Design Engineer, Senior Design Engineer and Chief Product Engineer for The Toro Company in Minneapolis, Minnesota. Toro did and does today design, manufacture and sell lawn and garden products, including consumer mowers, products in direct competition with lawn and garden products sold by One World Technologies, Inc., and products sold by Chervon (HK) Limited. During the course of my work at The Toro Company, I was responsible for among other things, the engineering design of industrial riding mowers, walk-behind mowers, pull-behind mowers, tractors, utility vehicles and trailer type turf maintenance machines, and was involved in design reviews of other engineers' designs, including consumer lawn mowers (both walk-behind and riding mowers), garden tillers and snow throwers. In my positions at Toro, I was in part responsible for keeping up to date on the development and technology of products and machines that were or could be viewed as being relevant to turf maintenance and outdoor power equipment products, including reviewing industry literature, attending trade shows, visiting

competitive equipment dealers, meeting with customers and reading relevant patents, to name a few such activities.

8. In the 1975-1976 time frame, I designed and released for production a riding lawnmower that contained an electrical safety interlock circuit system with switches that detected when the mower operator was in a position safe for him to operate the mower, and when various mower operational controls were in safe positions for various mower operating situations, situations that would prevent the engine from starting unless the drive wheels and/or cutting blades were disengaged (in neutral), and would prevent the drive wheels and cutting blades from engaging (running) unless the operator was in the intended location on the seat behind the steering wheel. This was the industry's first successful such design.² In addition, on occasion, I investigated mower-related accidents and helped determine contributions, if any, the mowers' design to these accidents. When I could, I used this experience to develop design improvements to reduce the likelihood of such incidents in the future. Further, I initiated product manual changes and designed and composed on-product warning labels to encourage safe operation and maintenance practices.

² See Exhibit C, document "Lawnmower Electrical Interlock Circuit" (April 4, 1976).

9. I have previously offered testimony as an expert witness. A list of my prior engagements in which I testified as an expert at trial or by deposition is attached as Exhibit B.

10. Based on my background and experience, as set forth more fully in my CV, I am familiar with the state of the art in the field of lawn and garden equipment, in particular, safety devices for lawn mowers, at least in the mid 2000's to mid 2010's. I am a technical expert in the fields relating to the asserted patents and other related fields, and I remain active in consulting in these fields.

11. Based on my professional experience, I believe I am qualified to testify as an expert on matters related to the patent that is the subject of this Petition.

III. UNDERSTANDING OF THE LAW

12. I am not a legal expert and therefore I offer no opinions on the law. However, I have been informed and am aware of legal standards that are relevant to my analysis, as summarized below.

13. I have been informed and understand that an issued patent claim is presumed valid and establishing a patent claim to be unpatentable in an *inter partes* review ("IPR") or post-grant review ("PGR") proceeding requires proof by

“preponderance of the evidence,” which I understand means proof that it is more likely than not that the claim is unpatentable.

14. I have been informed and understand that the first step in an unpatentability analysis involves construing claims, as necessary, to determine their scope. Second, the construed claim language is then compared to the disclosures of the prior art.

15. I have been informed and understand that claims are generally given their ordinary and customary meaning as understood by a person of ordinary skill in the art (“POSITA”) at the time of the alleged invention, in light of the patent specification and prosecution history. I have been informed that claim construction is a matter of law and that the final claim constructions for this proceeding will be determined by the Patent Trial and Appeal Board.

16. I have been informed and understand that a patent claim may be declared unpatentable if it is anticipated by, or rendered obvious in view of, prior art.

17. I have been informed and understand that a patent is to be understood from the perspective of a POSITA. Such an individual is considered to possess normal skills and knowledge in a particular technical field (as opposed to being a

genius). I have been informed and understand that in considering what the claims of a patent require, what was known prior to that patent, what a prior art reference discloses, and whether an invention is obvious or not, one must use the perspective of such a person of ordinary skill in the art.

18. I have been informed and understand that a patent claim is obvious under 35 U.S.C. § 103, and therefore unpatentable, if the claimed subject matter, as a whole, would have been obvious to a person of ordinary skill in the art as of the priority date of the patent based on one or more prior art references and/or the knowledge of one of ordinary skill in the art.

19. I have been informed and understand that an obviousness analysis must consider (1) the scope and content of the prior art, (2) the differences between the claims and the prior art, (3) the level of ordinary skill in the pertinent art, and (4) secondary considerations, if any, of non-obviousness (such as unexpected results, commercial success, long felt but unmet need, failure of others, copying by others, and skepticism of experts).

20. I have been informed and understand that a single prior art reference can render a patent claim obvious under 35 U.S.C. § 103 if any differences between that reference and the claims would have been obvious to a person of ordinary skill in the art. Alternatively, I have been informed and understand that a

prior art reference may be combined with other references to disclose each element of the invention under 35 U.S.C. § 103. Thus the teachings of two or more references may be combined in the same way as disclosed in the claims, if such a combination would have been obvious to one having ordinary skill in the art. I have been informed and understand that a reference may also be combined with the knowledge of a person of ordinary skill in the art, and that this knowledge may be used to combine multiple references. I have further been informed and understand that a person of ordinary skill in the art is presumed to know the relevant prior art. I have been informed and understand that the obviousness analysis may take into account the inferences and creative steps that a person of ordinary skill in the art would employ.

21. In determining whether a prior art reference would have been combined with other prior art or other information known to a person of ordinary skill in the art, I have been informed and understand that the following principles may be considered:

- whether the references to be combined involve non-analogous art;
- whether the references to be combined are in different fields of endeavor than the alleged invention in the Patent;

- whether the references to be combined are reasonably pertinent to the problems to which the inventions of the Patent are directed;
- whether the combination is of familiar elements according to known methods that yields predictable results;
- whether a combination involves the substitution of one known element for another that yields predictable results;
- whether the combination involves the use of a known technique to improve similar items or methods in the same way that yields predictable results;
- whether the combination involves the application of a known technique to a prior art reference that is ready for improvement, to yield predictable results;
- whether the combination is “obvious to try”;
- whether the combination involves the known work in one field of endeavor prompting variations of it for use in either the same field or a different one based on design incentives or other market forces,

where the variations are predictable to a person of ordinary skill in the art;

- whether there is some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill in the art to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention;
- whether the combination requires modifications that render the prior art unsatisfactory for its intended use;
- whether the combination requires modifications that change the principle of operation of the reference;
- whether the combination is reasonably expected to be a success; and
- whether the combination possesses the requisite degree of predictability at the time the invention was made.

22. I have been informed and understand that in determining whether a combination of prior art references renders a claim obvious, it is helpful to consider whether there is some teaching, suggestion, or motivation to combine the

references and a reasonable expectation of success in doing so. I understand, however, that a teaching, suggestion, or motivation to combine is not required.

23. I have been informed and understand that a patent claim is indefinite when it fails to inform, with reasonable certainty a POSITA about the invention's scope.

24. I have been informed and understand that a patent claim is invalid if the specification does not convey to a POSITA that the named inventor(s) had possession of the claimed invention.

25. I have been informed and understand that a patent claim is invalid when the specification fails to teach a POSITA how to make and use the full scope of the claimed invention without undue experimentation.

IV. MATERIALS CONSIDERED FOR THIS DECLARATION

26. In addition to my general knowledge, education, and experience, I considered the '26686 patent, its file history, the references cited by the '26686 patent, and the materials discussed in this declaration and the materials listed as exhibits in this IPR, in forming my opinions.

V. SUMMARY OF OPINIONS

27. Based on my review of the '26686 patent and its prosecution history, the other materials I have considered, and my knowledge and experience, my opinions are as follows:

28. The Claims of the '26686 patent are invalid for the following grounds:

Ground	Claim	Basis	References
1	1-7, 11-17	§103	Outils in view of Roelle and Matsunaga
2	8-10, 18-20	§103	Outils in view of Roelle, Matsunaga, Langdon and Nakano

VI. SUMMARY OF THE '26686 PATENT

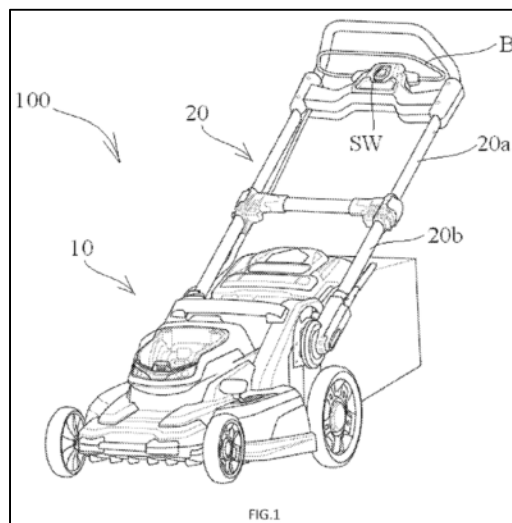
A. Brief Description

29. The '26686 patent claims priority to U.S. and foreign filing dates later than March 16, 2013, and is therefore subject to the first-to-invent (AIA) provisions of 35 U.S.C. §§102-103. It claims priority to U.S. application 14/511,490 filed October 10, 2014, and Chinese applications CN2013-10468919 filed October 10, 2013, and CN2014-10167041 filed April 23, 2014. TTI1001, 1.

30. The '26686 patent describes a system to prevent activation of electric gardening equipment, such as an electric walk-behind lawnmower, when its handle is improperly positioned. A simple electric circuit prevents activation of, and/or

halts, the motor for the lawnmower's blade when the handle is rotated out of position or in a collapsed state for storage/shipment. By allowing the equipment to operate only when the handle is in its proper in-use position, the patent purports to reduce the chance of injury to a user.

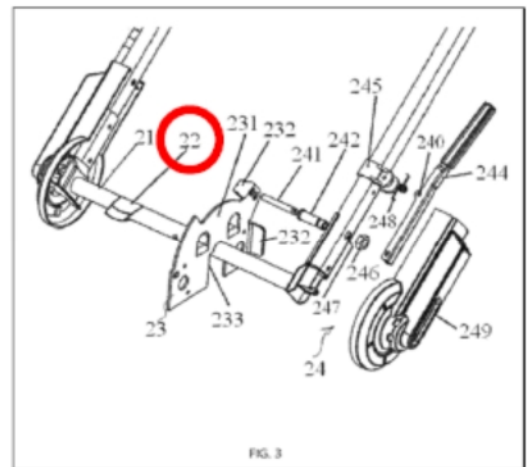
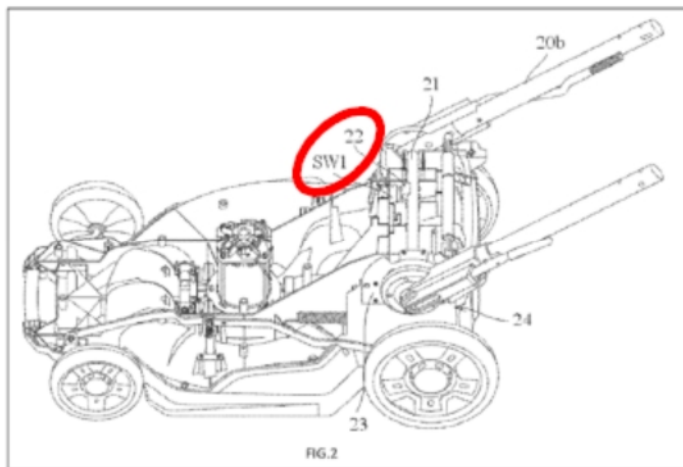
31. Figure 1 illustrates the walk-behind lawnmower's main body 10 containing an electric motor and cutting blade (not shown). On its handle 20 is a user-operated trigger 'B' that triggers a contact switch 'SW' electrically connected to a controller (not shown) that controls on/off operation of the motor. TTI1001, 6:8-12, 6:29-33.



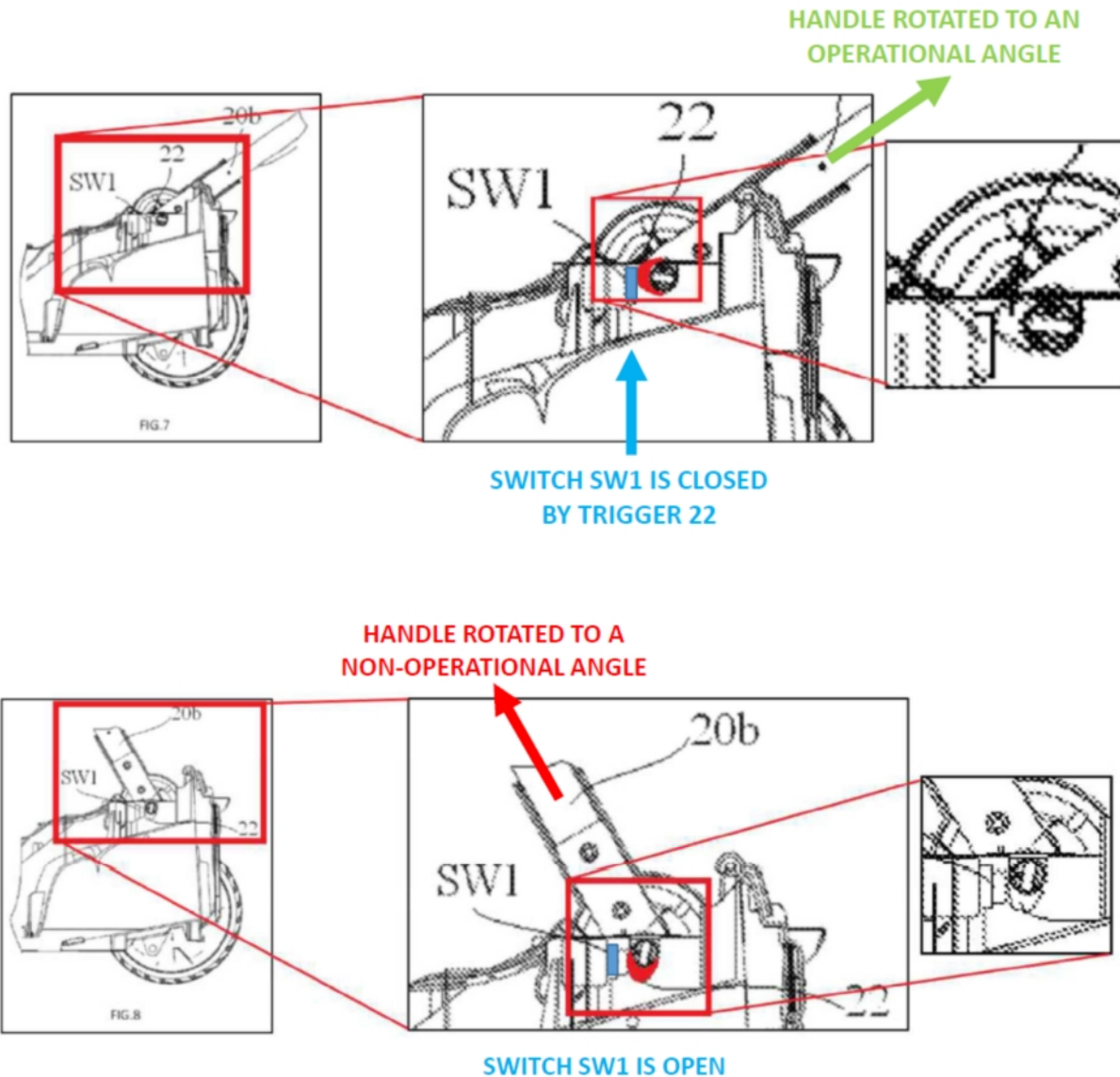
B. Rotatable Handle

32. The safety control system can include a contact switch SW1 triggered when handle 20 is at an appropriate angular position relative to main body 10. A

rotation shaft 21 for handle 20 includes a protruding, oblong “trigger member 22” (often called a “cam”) that engages contact switch SW1 on main body 10 when rotated to its operational angle. *See* annotated Figures 2, 3 below. “[T]rigger member 22 triggers the contact of the contact switch SW1 when it rotates to a designated angle (generally, when the handle 20 rotates to a designated secure position).” *Id.*, 6:66-7:2. Contact switch SW1, like contact switch SW on handle 20, is connected in series on the same electrical line as the mower’s power supply circuit so that, when contact switch SW1 is electrically open or off, the user-operated trigger ‘B’ and its switch SW cannot activate the motor, thereby achieving safety protection. *Id.*, 7:52-60.



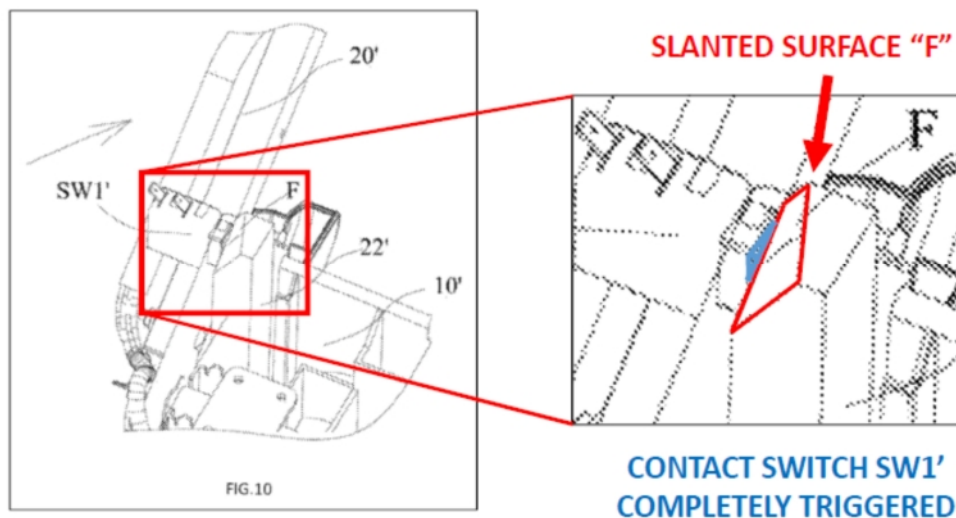
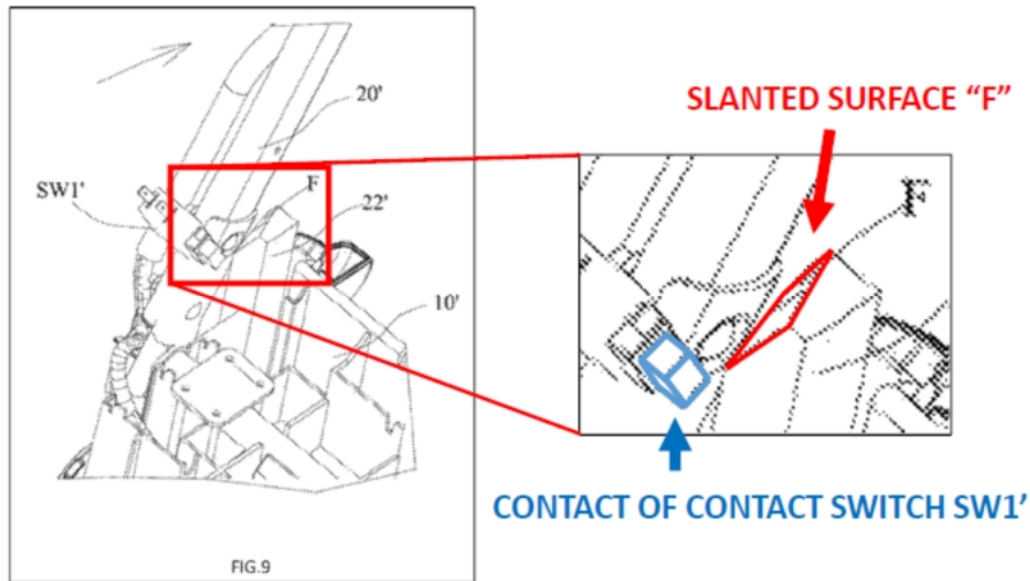
33. The handle’s operational (Figure 7) and non-operational (Figure 8) angles are annotated below.



34. Another rotation-detecting embodiment is in Figures 9-10. A contact switch SW1' is mounted to handle 20' and is turned 'on' when it encounters a slanted surface F on main body 10'. As handle 20' rotates to its operational angle, "slant surface F gradually presses the contact of the contact switch SW1' along with the rotation [sic], and when the handle 20' rotates to a

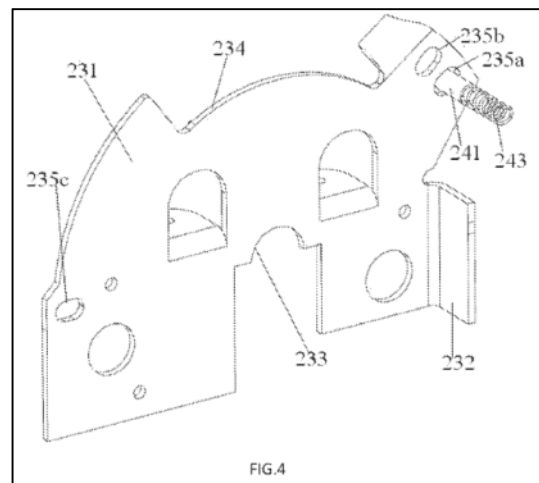
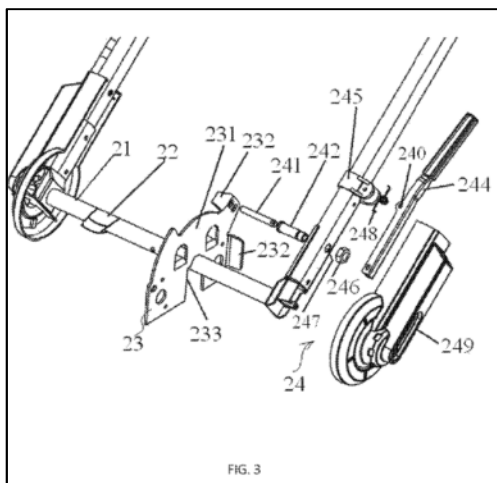
designated angle, the slant surface F completely triggers the contact switch SW1'."

Id., 7:14-18. Annotated Figures 9-10 are below:



35. The first few columns of the Challenged Patent describe how a manually operated "telescopic pin 241" is inserted into one of several angle-limiting holes 235a, 235b, 235c in a "level change locking plate 231" to adjust

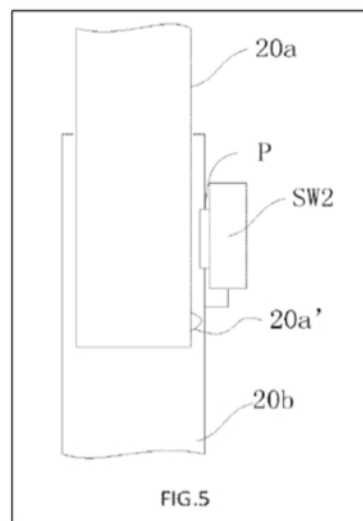
handle 20's angular position. *See* TTI1001, 3:3-5:24. Two operational positions are where pin 241 engages hole 235a or 235b (*see* Figures 3-4), and pin 241 engages hole 235c to lay the handle over the mower body. Contact switch SW1 cannot discern between the operational positions 235a and 235b, so when the claims refer to a “designated position” or similar term, they necessarily encompass a range of locations.



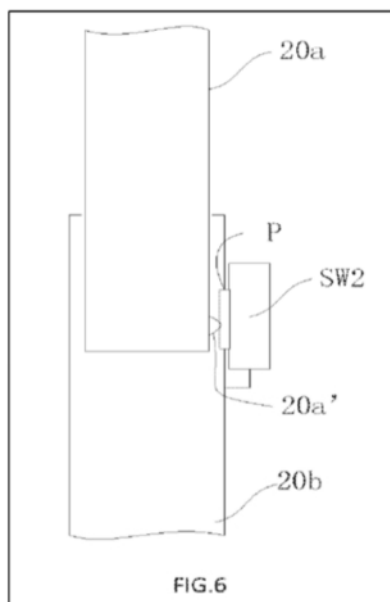
C. Telescopic Handle

36. Handle 20 includes two telescoping members 20a, 20b that allow inner tube 20a to be slid into or “drawn out of the telescopic tube 20b (*i.e.*, when the handle 20 is in an extended state). . . .” TTI1001, 7:48-49. In the extended state of Figure 6, a protruding “trigger member 20a’ triggers the contact P of the contact switch SW2 via contact.” *Id.*, 7:49-51. Contact switch SW2, like switches SW and SW1, is connected in series on the same electrical line of the mower’s power

supply circuit (*id.*, 7:52-54) such that, in the handle's extended state, switch SW2 is closed and allows electric power to flow from an electric power source to the motor when the user activates trigger 'B'. Conversely, when handle members 20a, 20b move to the more collapsed state of Figure 5, "contact switch SW2 switches off" such that the user-operated trigger 'B' is ineffective "to allow the electric power source to provide electrical energy to the motor, thereby achieving safety protection." *Id.*, 7:52-60. See annotated Figures 5 and 6 below.



NON-OPERATIONAL STATE
TUBES 20a, 20b COLLAPSED
SWITCH "SW2" = OPEN
MOTOR ACTIVATION DISALLOWED



OPERATIONAL STATE
TUBES 20a, 20b EXTENDED
SWITCH "SW2" = CLOSED
MOTOR ACTIVATION ALLOWED

D. Prosecution History of the '26686 Patent

37. The application for the '26686 patent was filed as a continuation of U.S. application serial no. 14/511,490 which issued as U.S. Patent 9,596,806. It

was filed with twenty (20) claims that issued as-is and are now the Challenged Claims.

38. The USPTO's first Office Action was a Notice of Allowability that included no Reasons for Allowance or other substantive comment. TTI1002, 26-30. The '26686 patent issued June 5, 2018.

E. Prosecution History of the '806 Patent

39. The '806 patent was filed as application SN 14/511,490 on October 10, 2014, with twenty (20) claims. In the first Office Action, the USPTO rejected claims 3-9 and 13-20 under §112(b); claims 1-5 and 11-14 under §102(a) over U.S. 5,203,147 ("Long"); and claim 10 under §103 over Long and U.S. 3,659,170 ("Burkett"). TTI1019, 388-394.

40. In response, the applicant made substantial amendments to independent claims 1 and 11, revised the language of other claims to address the §112(b) rejection, and canceled seven (7) claims. *Id.*, 370-381. The USPTO thereafter issued a Notice of Allowability. *Id.*, 352-354.

41. On or about August 29, 2016, the applicant filed a Request for Continued Examination ("RCE") together with an Information Disclosure Statement. *Id.*, 308-340. The examiner immediately prepared a second Notice of Allowability on or about August 31, 2016. *Id.*, 296-302.

42. On or about October 12, 2016, the applicant filed a second RCE to consider additional Information Disclosure Statements submitted after the second Notice of Allowability. *Id.*, 29-30; 38-41; 157-162. The USPTO issued a third and final Notice of Allowability on or about November 3, 2016. *Id.*, 11. The '806 patent issued March 21, 2017.

F. Priority Date of the Challenged Claims

43. The '26686 patent claims priority to two Chinese applications filed October 10, 2013, and April 23, 2014, respectively. TTI1001, 1. Petitioner's counsel informs me that they do not believe it is important to this Petition to determine the actual priority date to which each Challenged Claim is entitled because the prior art relied upon herein qualifies as prior art as explained, *infra*.

G. Level of Ordinary Skill in the Art

44. A person of ordinary skill in the art ("POSITA") as of October 10, 2013, which is the earliest alleged priority date of the Challenged Patent, would have had at least a bachelor's degree in mechanical engineering, electrical engineering, or similar technical field, with at least three years of relevant product design experience. An increase in experience could compensate for less education.

VII. CLAIM CONSTRUCTION UNDER 37 C.F.R. § 42.104(b)(3)

A. “Power Supply Circuit” (Claims 1, 2, 5, 9-12, 15, 19-20)

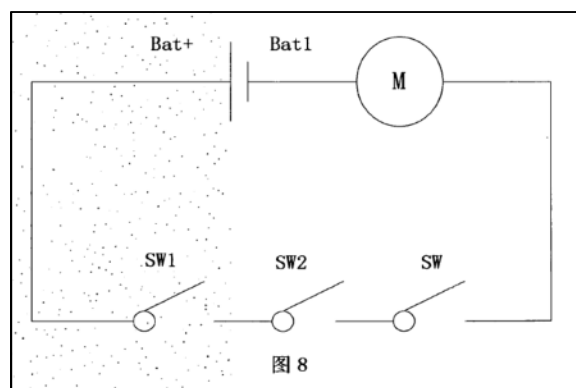
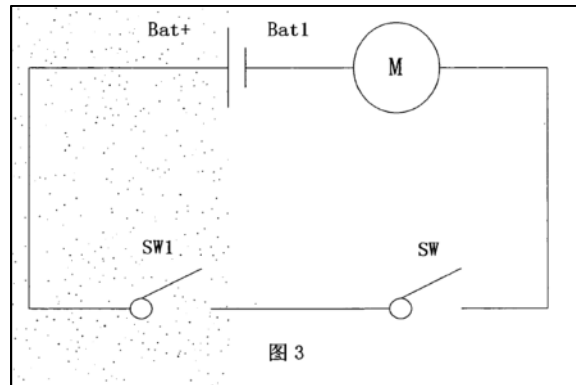
45. The claims recite phrases such as, on the one hand, “a switch connected in the power supply circuit to connect the electric power source to the motor” (claim 12, 10:23-24) or, on the other, a “switch connected to the power supply circuit to connect the electric power source to the motor” (claim 2, 8:56-58; *see also* claim 11, 10:16) or a “signal source for sending a control signal to the power supply circuit to disconnect the electric power source to the motor” (claim 5, 9:2-5; *see also* claim 9, 9:31-32; claim 10, 9:40-41; claim 15, 10:36-38; claim 19, 10:62-63; claim 20, 11:5) making it important to distinguish between, on the one hand, the actual “power supply circuit” and components that are recited as being connected “in” it, and on the other hand, control-type component(s) that are connected “to” or send signal(s) “to” the power supply circuit. POSITA would accordingly understand “power supply circuit” to mean the electrical path between an electric power source and the claimed “motor” taken by (high-power) current that drives the motor.

46. First, this construction is based on the claim term (“*power supply circuit*”). Second, it reconciles the claims’ distinction of a switch “in” the power control circuit (claim 12) from a switch “connected to” or a signal source sending a control signal “to” the power control circuit (claims 1, 2, 5, 9-11, 15, 19-20).

Third, it is consistent with the specification's distinction of a switch "in" the power supply circuit from a signal source sending a control signal "to" the power supply circuit. TTI1001, 5:66-67; 6:18-21 ("This first signal source device may be a photoelectric switch which participates in control by sending a control signal to the switch in the power supply circuit."); 6:49-53 ("The second control device comprises a second switch or a second signal source device, or a combination thereof. The second switch is connected in the power supply circuit, and the second signal source device can send a control signal to the power supply circuit."); 7:30-34 ("The third control device comprises a third switch or a third signal source device, wherein the third switch is connected in the power supply circuit, and the third signal source device can send a control signal to the power supply circuit."); 6:7-11 ("[O]ne first switch is a contact switch that can be triggered by the trigger B and connected in series in a power supply circuit of the motor, and the motor is not powered when it is switched off, and it switches on the circuit when it is triggered by the trigger B"); 6:12-15 ("The other first switch is a position switch which is also connected in series in the power supply circuit of the motor, and it switches on the circuit when it detects that the trigger B moves to a corresponding position."); 6:18-21 ("This first signal source device may be a photoelectric switch which participates in control by sending a control signal to the switch in the power supply circuit."); 6:29-33 ("Referring to FIG. 1, as the simplest solution, the first control

device only comprises one first switch which is connected in series in the power supply circuit. The first switch is a contact switch SW that can be controlled by the trigger B.”); 6:50-53 (“The second switch is connected in the power supply circuit, and the second signal source device can send a control signal to the power supply circuit.”); 7:31-34 (“...the third switch is connected in the power supply circuit, and the third signal source device can send a control signal to the power supply circuit.”); 7:52-54 (“Preferably, the contact switch SW, the contact switch SW1 and the contact switch SW2 all are connected in series on the same line of the power supply circuit.”). Third, it is consistent with the specification’s statements that the “signal source” sending a signal “to” the power supply circuit can be a “switch.”³³ *Id.*, 6:27-28 (“the first signal source device is one of a contact switch, a proximity switch, a Hall switch and a photoelectric switch”); :6:56-57 (same for “second” signal source); 7:37-38 (same for “third” signal source). Fourth, it is consistent with circuits in priority application CN2013-10468919 showing two or three switches connected “in” the power supply circuit (the CN application is incorporated by reference by the Challenged Patent (TTI1001, 1:5-11)):

³³ See PGR §112 challenges.



TTI1019 ('806 prosecution), 440, 443.

47. POSITA would construe “power supply circuit” as *the path between an electrical power source and the motor taken by current that drives the motor.*

B. “Locks” and “Unlocks” (Claims 1, 8, 11, 18)

48. The verbs “lock” and “unlock” are recited in the independent claims in the context of a control device (un)locking another device such that the latter is allowed or not allowed to start the motor. The Challenged Patent discloses no mechanical lock, so POSITA would interpret “locks” and “unlocks” as,

respectively, “electrically disabling” and “electrically enabling” the other device to start the motor.

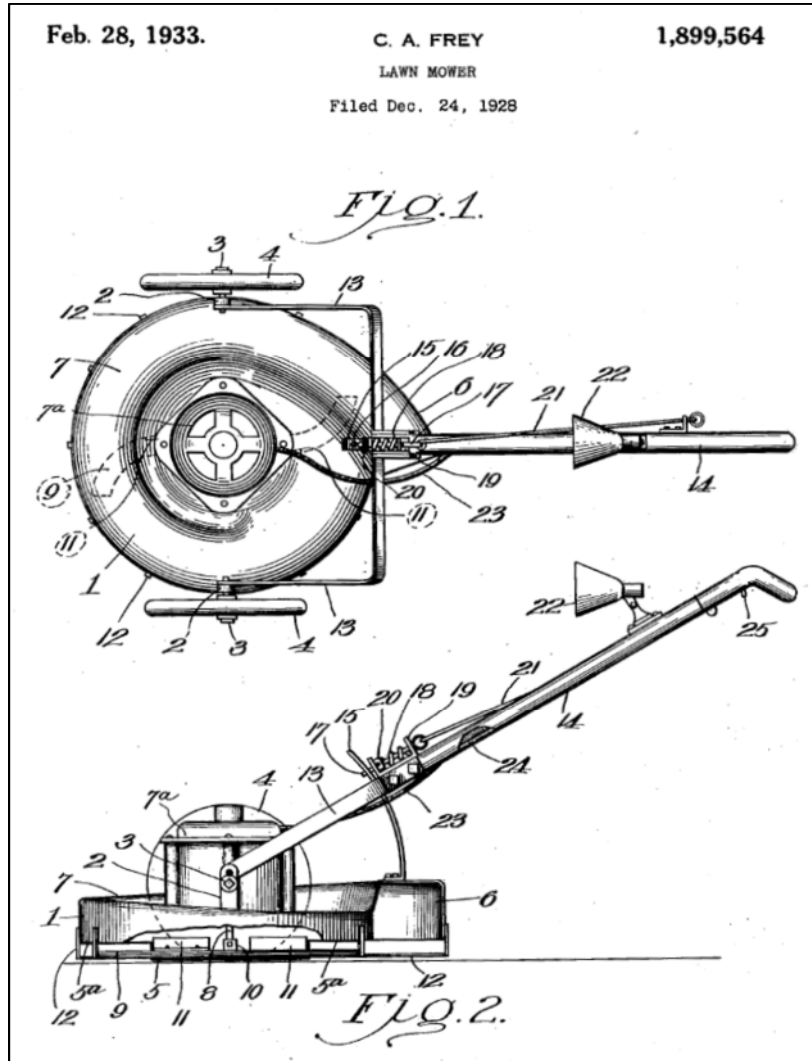
VIII. BACKGROUND TECHNOLOGY KNOWN BY PERSONS OF ORDINARY SKILL IN THE ART

49. A POSITA would have known that the problems – and solutions – asserted in the Challenged Patent had existed long before its earliest priority date.

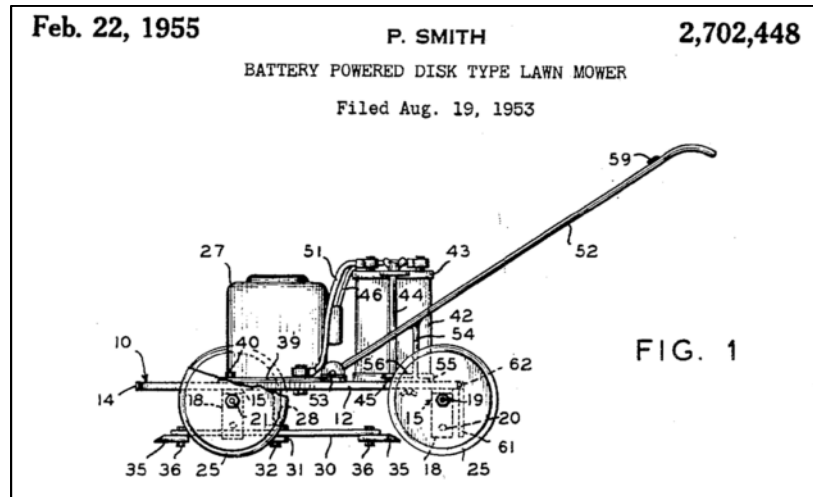
A. ELECTRIC MOWERS ALREADY HAD ROTATABLE AND TELESCOPIC HANDLES

50. Electric lawnmowers were known since the 1920's, if not earlier, and battery-powered lawnmowers date at least to the 1950's. Examples include Frey (TTI1009 (U.S. Patent 1,899,564)) and Smith (TTI1010 (U.S. Patent 2,702,448)).

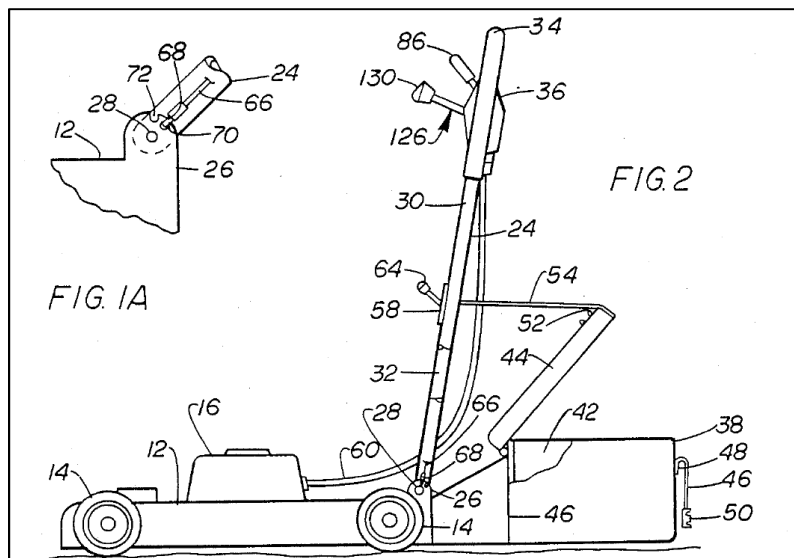
51. Frey's user locks the rotating handle 14 at a desired in-use position using a manually operated pin 17 insertable into one of several angle-limiting holes 16 in a locking plate (“quadrant 15”). As in the Challenged Patent, locking pin 17 is spring biased and controlled by a lever on the handle 14. TTI1009, 2:4-28, Figures 1-2. Frey's handle also included a user's operation assembly (manual component 25) to connect/disconnect power to electric motor 7a and blade 9 in the main body of the mower. *Id.*, 2:23-28; 1:67-77.

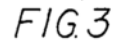


52. Smith's handle 52 is freely rotating (TTI1010, 1:73-81, Figure 1) and includes an operation assembly 59 that operates an electrical solenoid switch 48 "which closes the circuit of the battery to the motor." *Id.*, 2:15-34.



53. Another locking plate 26 and locking pin 68 is taught by Roelle (TTI1011, U.S. 4,753,062) to keep a lawnmower handle at either a use position 70 or a non-use position 72 where an operator could access a cut-grass collector 38. For safety, the non-use position 72 operated an electric switch 56 to kill the motor 16 and disable the user's operation assembly 130 and its circuit switch 84 from enabling the motor to become activated. *Id.*, 4:6-22; Figures 1A, 2-3.





54. To rotate a handle even further over the mower's main body for storage, POSITA would have turned to Langdon (TTI1012, U.S. 5,209,051) whose "bracket 66 may have a vertical side 68 having latch means 70 permitting the [handle's] lower tubular portion 62 to be secured in place either in the push position or in a forward collapsed position as shown at 80 [in Figure 5]." *Id.*, 4:8-12; Figure 5 (annotated below). Langdon's handle also included two telescoping members 62, 82 to further reduce the mower's storage footprint. *Id.*, 4:1-20.



55.

56. Langdon's telescoping tubes 62, 82 were lengthwise adjusted by a "spring biased pin [69] to lock the handles in [an] operative push position." *Id.*, 4:6-8; Figure 5.

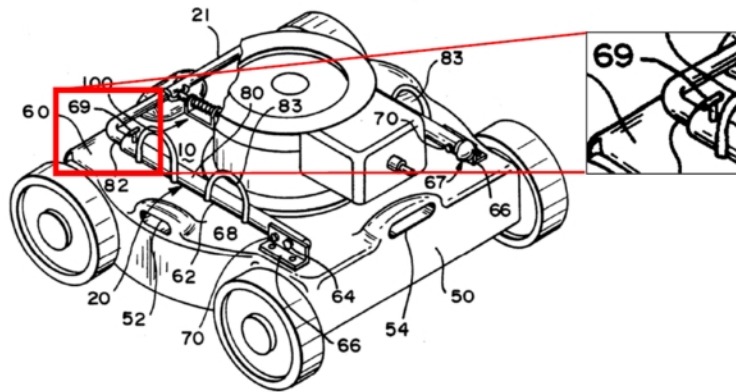
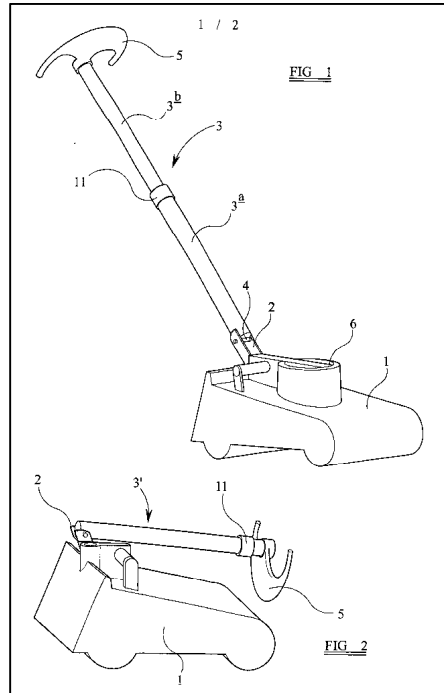
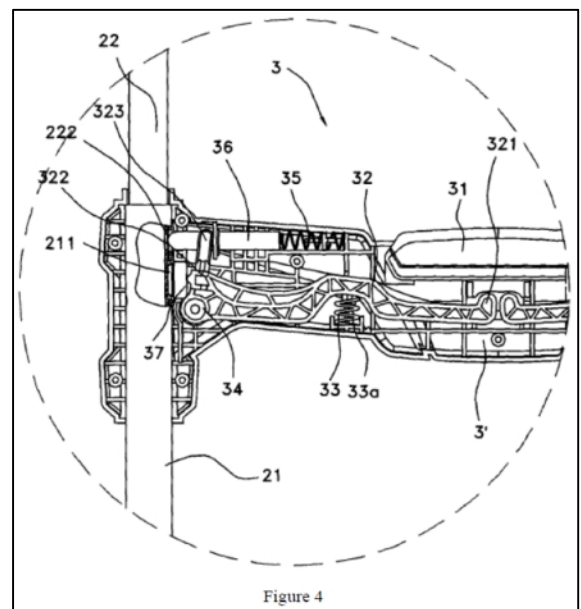
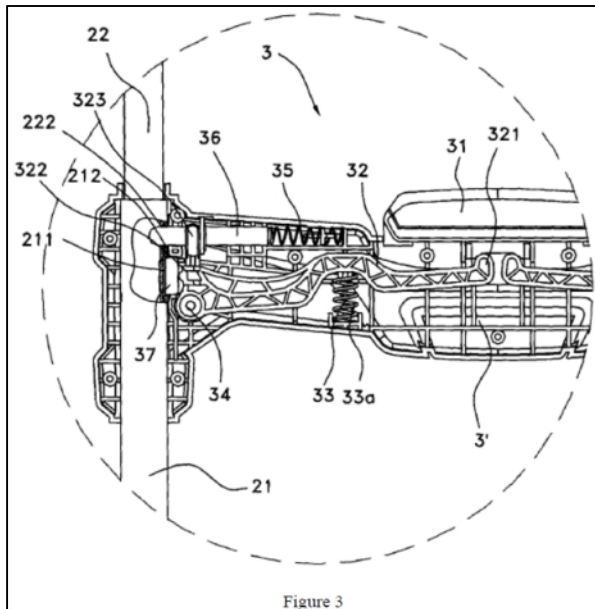
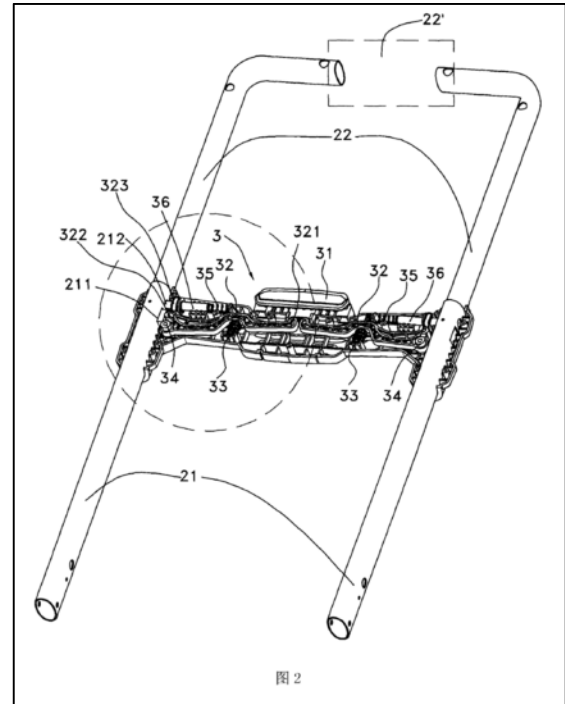
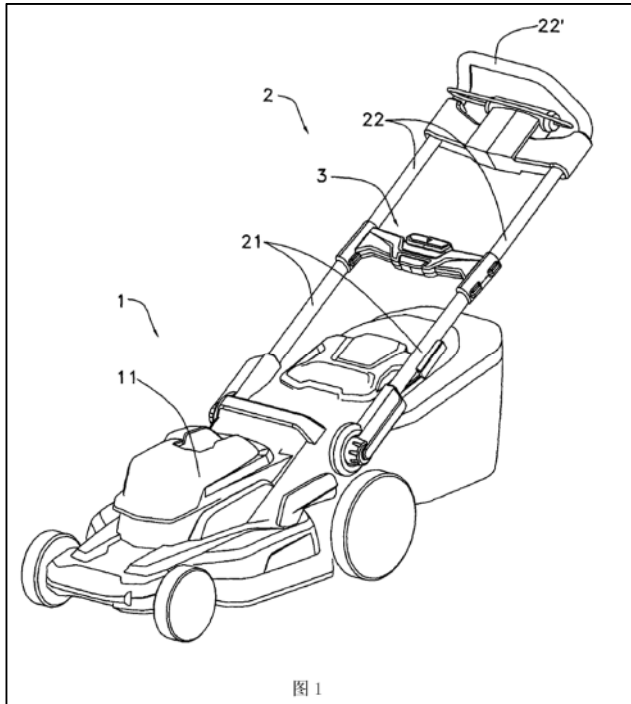


FIG. 5

57. Yet another mower taught by Reichart (TTI1007, GB 2,386,813) put many of these ideas together with a telescoping handle 5 that preferably locked at an in-use angle but could rotate to a vertical non-use position or all the way over the main body for storage. *Id.*, 4:8-20; Figures 1-2. As with previous examples, above, Reichart contemplates a cut-grass collector at the rear of the mower. *Id.*, 2:1-10.

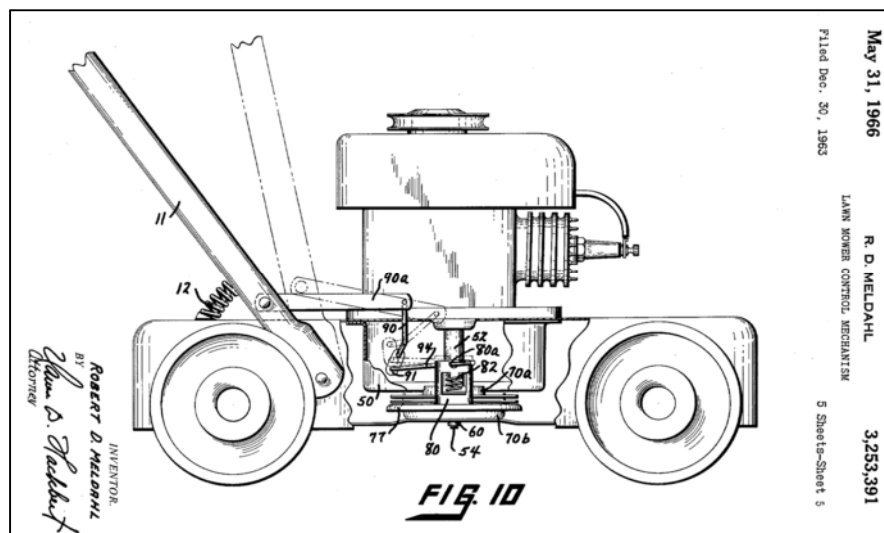


58. By 2011, the Patent Owner itself had publicly disclosed a push-type lawn mower whose handle rotated and had retracting telescopic members 21, 22. TTI1020 (CN202019551U certified English translation), Figs. 1-4; [0023].

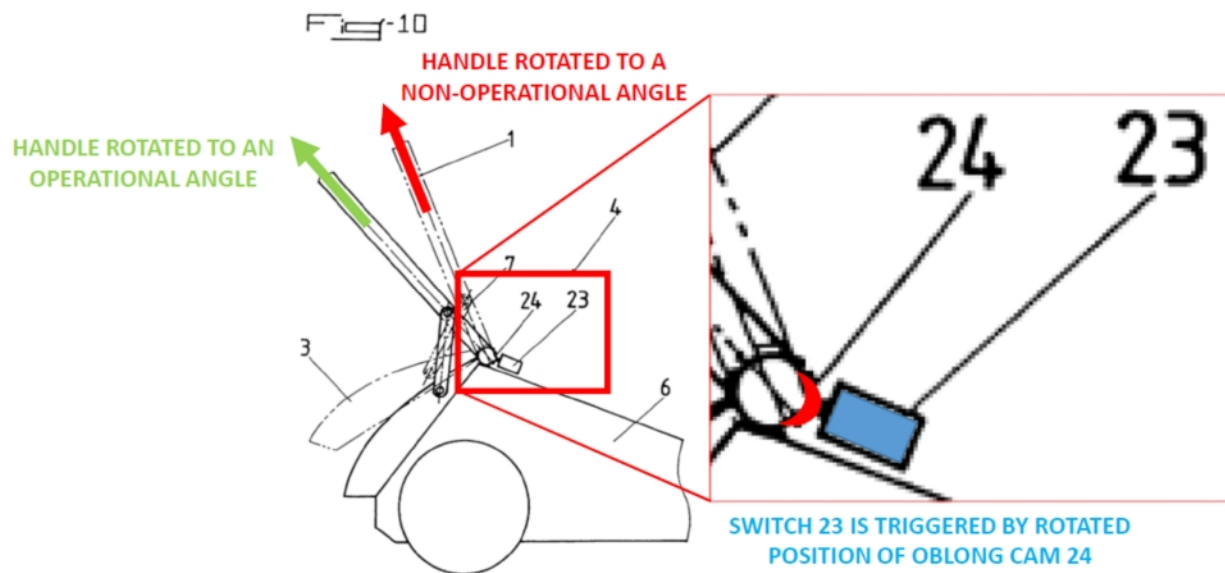


B. MOWERS HAD SAFETY DEVICES THAT HALTED AND DISABLED ACTIVATION OF THE MOTOR BASED ON HANDLE POSITION

59. By 1963 it was “known, [that] the hazards relating to the use of rotary power lawn mowers are widespread. In most cases involving injury cause by a rotating mower blade, the operator is located other than in his normal operating position or, alternatively, is in the normal operating position, but is standing so close to the mower that the mower handle is raised.” TTI1004 (U.S. 3,253,391 (Meldahl)), 1:14-20. Meldahl’s solution stopped the blade by raising the handle to a vertical, non-use position so that “whenever the user is starting or stopping the mower engine, removing debris from the front of the mower, or, when operating, the user stands too close to the mower or the mower rolls backwardly, resulting in the upward movement of the mower handle, the mower blade stops rotating, preventing any injury.” *Id.*, 1:31-36.

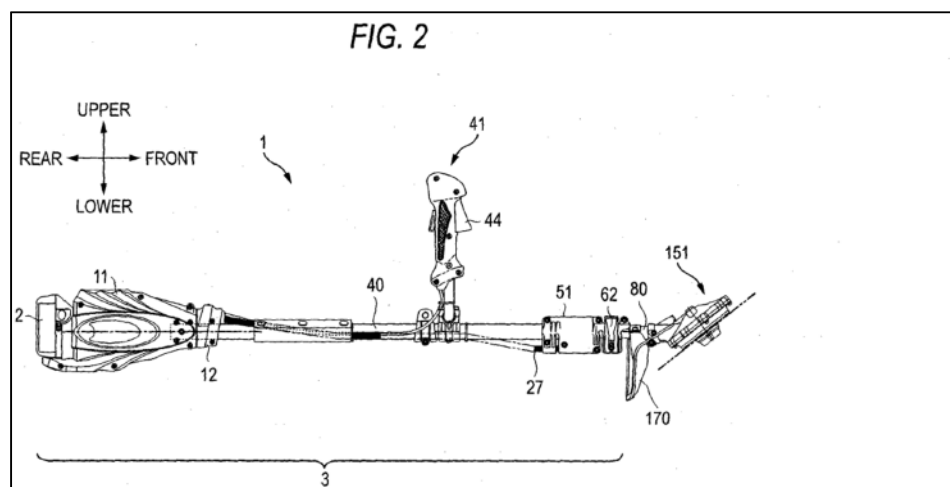
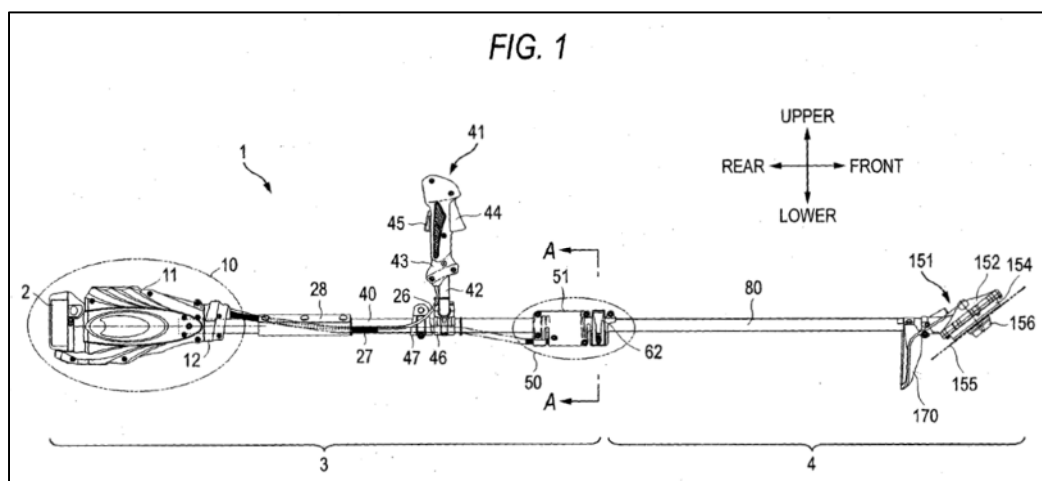


60. Roelle, *supra*, taught a more modern system than Meldahl, but Outils (TTI1013 (FR 2,768,300); certified translation, TTI1014) taught a rotating cam **identical** to the Challenged Patent's. In Figure 10, an actuator 23 interacted with a cam 24 provided on the handlebar 1. *Id.*, 8:23-24. As soon as the handlebar 1 is tilted forward, action on the actuator 23 by cam 24 would stop the motor and/or brake the cutting blade. *Id.*, 8:25-29. Outils' actuator 23 could be an electrical supply cut-off switch for an electric motor and allowed a restart only after being returned to its in-use position. *Id.*, 7:25-29; 9:10-13; Figure 10 (annotated below).



61. POSITA also knew that telescoping handles had safety devices to halt the electric motor and disable its activation. Nakano's (TTI1015, WO2013/122266A2) telescoping handle members 40, 80 used redundant safety mechanisms that halted the electric motor and disabled a restart until the safety

device was reset. Like the Challenged Patent, Nakano used a switch in conjunction with an indentation in the inner telescoping pipe. If the pipes collapsed relative to one another, the switch would trip (or in alternative embodiments, a signal source would send control signal(s)) to halt the motor and disable any restart. *Id.*, Figures 1-2. Details are in the challenges, *infra*.



62. By 2012, POSITA knew that industry guidelines and governmental regulations imposed many restrictions intended to make lawnmowers more safe.

Among them were U.S. federal regulations codified at 16 CFR 1205 (effective 1982; TTI1008 is the January 1, 2012 edition) which applied to electrically powered mowers and those powered by a gasoline engine (*id.*, 1205.3(7), (9)); and ANSI B71.1 (TTI1030) which provided industry guidance. They “prescribe[d] safety requirements for certain walk-behind [consumer-grade] power lawn mowers ... intended to reduce the risk of injury to consumers....” *Id.*, 1205.1(a).

Accordingly, POSITA would have been motivated to design lawnmowers according to those regulations, and to make obvious modifications to turn non-complying mowers in the prior art into compliant designs.

63. As one example, federal regulations required a walk-behind lawnmower’s blade control system to halt the blade’s motion “within 3 seconds after release of the control.” *Id.*, 1205.05(a)(iii). Accordingly, for any claim limitation in the Challenged Claim that requires the blade and/or motor to halt, POSITA would have known that such a limitation was already required by law, and would have been motivated to make obvious modifications to include that feature in any walk-behind mower.

IX. GROUND 1: CLAIMS 1-7, 11-17 ARE OBVIOUS UNDER AIA 35 U.S.C. § 103 OVER OUTILS (FR 2,768,300) IN VIEW OF ROELLE (U.S. 4,753,062) AND MATSUNAGA (U.S. 8,098,036).

64. Outils (TTI1013; certified English translation TTI1014) published March 19, 1999, Roelle (TTI1011) published June 28, 1988, and Matsunaga (TTI1006) published January 12, 2012, each before the earliest foreign priority date of October 10, 2013, claimed by the '26686 patent. Each qualifies as prior art under AIA 35 U.S.C. 102(a)(1) as a “printed publication ... before the effective filing date of the claimed invention” and Roelle and Matsunaga also qualify under 102(a)(2). Neither Roelle nor Matsunaga were cited in the '26686 patent or prosecution history.

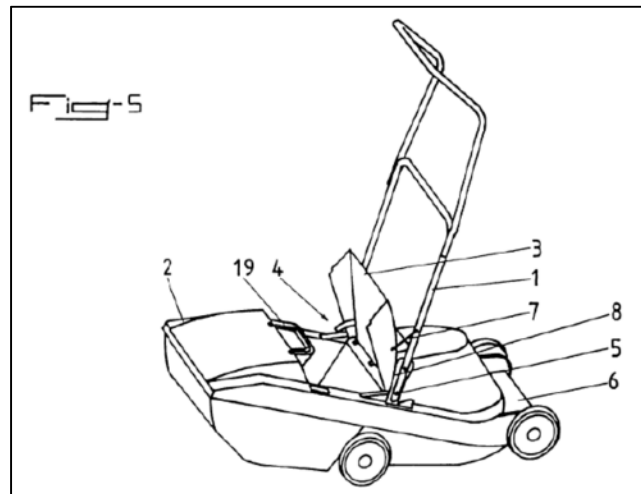
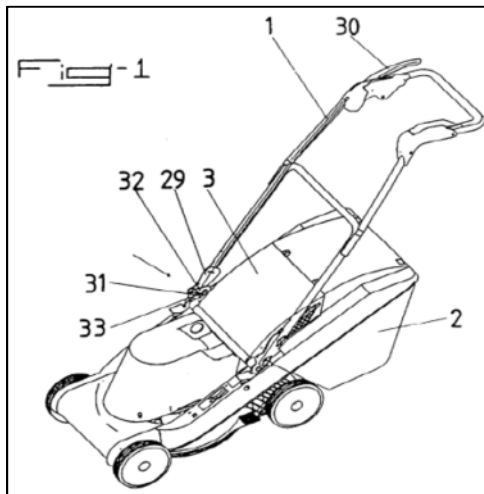
65. Patent Owner submitted only a machine translation of Outils' French-language EP0903074A1 and withheld Outils' drawings. TTI1001, 2; TTI1002, 267-292.

66. Claims 1-10 are identical to 11-20 except for their preambles and claims [2b]/[12b]. Accordingly, they are treated together below.

[1P]⁴ 1. A gardening tool, comprising:

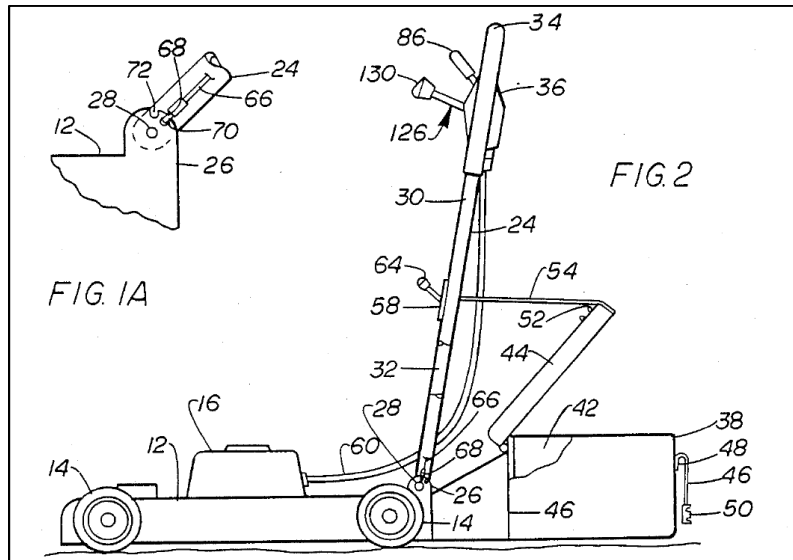
[11P] 11. A mower, comprising:

67. If the preamble is deemed a limiting element of the claim, then Outils discloses a gardening tool, namely a mower. The “Title of Invention” is “Lawnmower Comprising Safety Device for Preventing Access to the Rotating Cutting Blade” and its Description is directed to an “electric push mower type, but it could also be of the self-propelled type comprising an electric mower or thermal mower.” TTI1014, 3:28-30. POSITA would have understood all of its embodiments – including that of Figure 10 – likewise to encompass electric walk-behind lawnmowers.



68. Roelle is likewise directed to a lawnmower.

⁴ Petitioner’s counsel added these reference letters to help track the claim language.



[1a] a main body having at least a functional accessory and a motor for driving the functional accessory;

[11a] a main body having at least a functional accessory and a motor for driving the functional accessory;

69. Outils' mower has a main body ("casing 6") which is only diagrammatically shown. TTI1014, 5:27. Casing 6 has a functional accessory, e.g., a "cutting device" (*id.*, 3:27) which is a rotating cutting/mowing blade (*id.*, 3:33, 4:3). Its motor can be electric (*id.*, 3:29) and would have been understood by POSITA as driving the cutting/mowing blade. POSITA would have understood all embodiments to include the casing 6, the cutting/mowing blade and a motor for driving the blade.

[1b] a handle, rotatably connected to the main body, having at least one operation assembly for being operated by a user to control the motor when the handle is in a secure position;

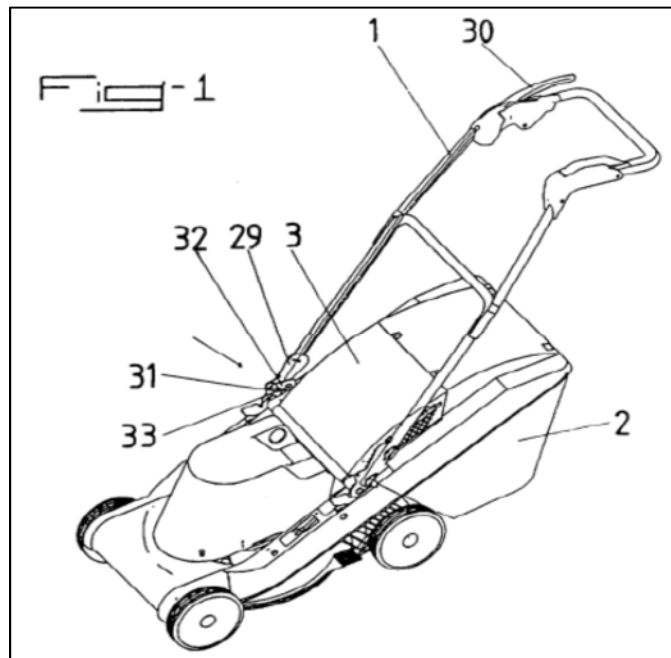
[11b] a handle, rotatably connected to the main body, having at least one operation assembly for being operated by a user to control the motor when the handle is in a secure position;

70. Outils' mower handle 1 is rotatably connected to the main body (casing 6). *Compare* Figures 1 and 5; Figures 6 and 7; *see* handle positions in Figures 4, 10, 11.

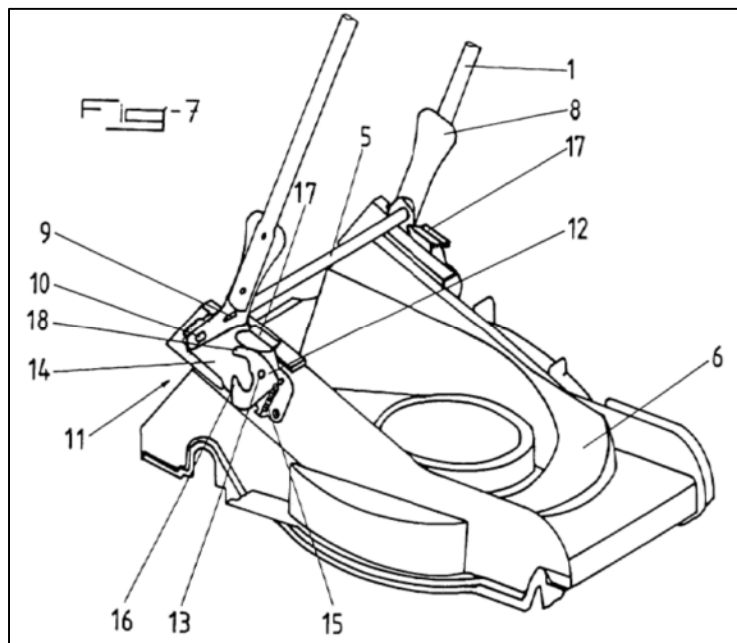
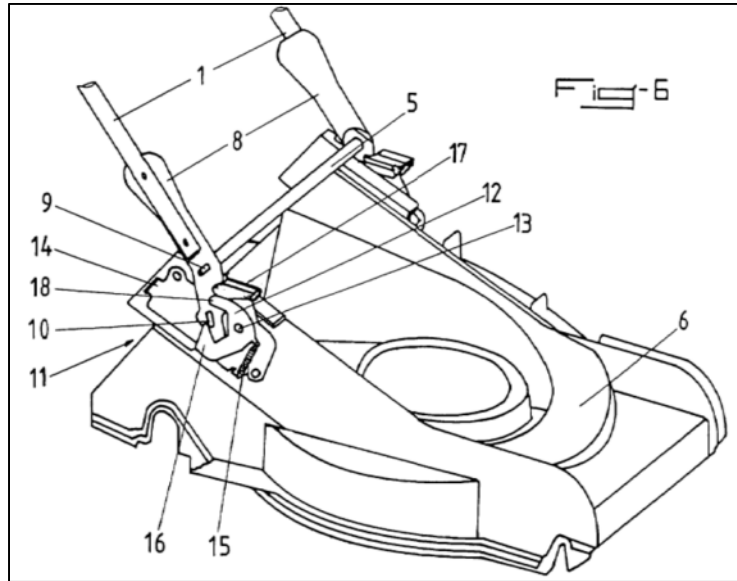
71. We learn in claims [1f] and [11f], *infra*, that the claimed operation assembly is simply a user-operated component, and that an electric circuit's "control device" like a switch (*see* claims [9], [19]) associated with it is claimed separately.

72. Outils' handle 1 has an operation assembly 30 which may be "a handle, lever a bow or the like, provided on the handlebar 1[.]" TTI1014, 4:8. POSITA would have understood that it is operated by a user to control the motor when the handle is in a predetermined secure (in-use) position. For example, operation assembly 30 uses "a remote control cable 29 [Figure 1], which acts on a motor brake, a brake coupling or an electrical supply contactor[.]" *Id.*, 4:6-7. "Thus, when the control is not actuated, for example when the user is getting ready to empty the cut-grass receiving receptacle 2, the cable 29 is released and the

driving of the blade is interrupted, either by cutting the power to the motor or by interrupting the drive of the spindle of the blade by acting on a brake and/or a coupling.” *Id.*, 4:14-17.



73. The in-use position of Outils’ handle 1 is secure because of a locking mechanism (lock 12) that engages a locking member (detent 10) on handle 1 against a hook-like extension piece 16 (Figure 6). Detent 10 may be unhooked (Figure 7) to rotate handle 1 forward and allow the user to empty the cut-grass receptacle. *See* TTI1014, 6:20-7:13.



74. To the extent it is determined that the claimed operation assembly is neither taught nor inherent in Outils, POSITA would have found it obvious to include one to enable the user to selectively control (activate and deactivate) the motor, and thus the blade, when the handle is in a secure in-use position to avoid

the danger of a rotating blade when it is not desired and to save power when not needed.

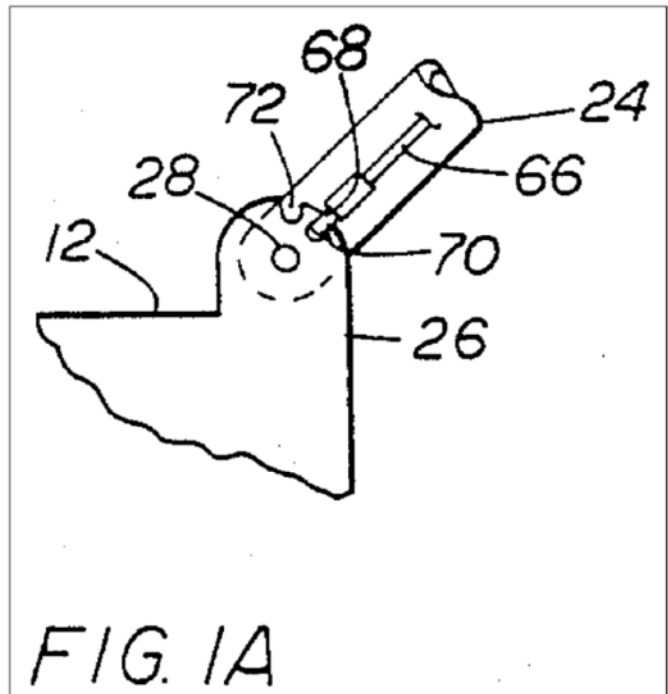
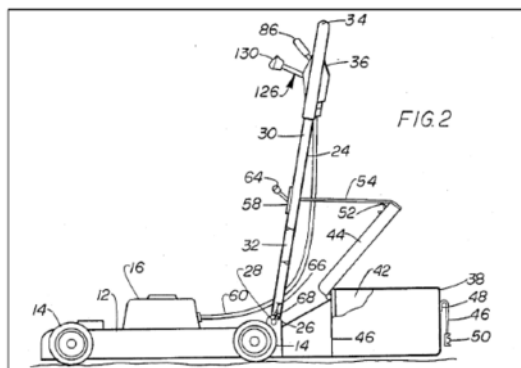
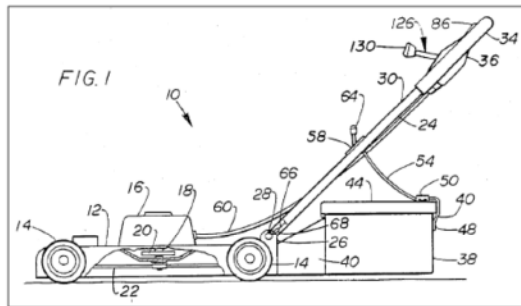
[1c] a locking mechanism for locking the rotating position of the handle;

[11c] a locking mechanism for locking the rotating position of the handle;

75. Outils expects rotatable handle 1 to be secure at its use position using the locking structure of Figures 6 and 7. A locking mechanism (pivoting lock 12 with its extension piece 16) locks the rotating position of the handle. The subsequent claim limitation, *infra* (“locking member”), however, requires the handle to be kept at an *accommodating* position when the user is *not* in use. POSITA would have recognized that Outils’ lock 12 could inadvertently *and dangerously* allow handle 1 to rotate from its accommodating position of Figure 7, *i.e.*, a position when the mower is not in use and/or the user is emptying the cut-grass receptacle, to its in-use position of Figure 6 (or at least closer to that position). POSITA would thus have been motivated by safety to lock handle 1 in its non-use, accommodating position of Figure 7.

76. Roelle teaches a walk-behind mower similar to Outils’ with a rotating handle 24 that permits a user to empty a rear-located cut-grass receptacle. TTI1011, Figures 1, 1A, 2. Like Outils, Roelle secures rotating handle 24 in its in-use position (Figures 1, 1A) but the locking structure including a locking

mechanism (spring biased pin 68) also keeps the handle in an accommodating, vertical position when the mower is not in use (Figure 2). *Id.*, 3:67-4:5.



77. POSITA would have found it obvious to provide Outils with the locking mechanism of Roelle to keep the handle in its accommodating position when not in use.

78. For claims 1 and 11 of the '26686 patent, the claimed "locking mechanism" is met by Roelle's latching pin 68 designed to fit the recesses 70, 72 of plate or lug 26.

[1d] a locking member configured to engage with the locking mechanism and providing at least a locking structure to cause the locking mechanism to keep the handle at an accommodating position relative to the main body when the gardening tool is not being used; and

[11d] a locking member configured to engage with the locking mechanism and providing at least a locking structure to cause the locking mechanism to keep the handle at an accommodating position relative to the main body when the mower is not being used; and

79. As described for limitations [1c] and [11c], POSITA would have found it obvious to provide Roelle's locking structure in Outils' mower so that handle 1 can be locked at the non-use, accommodating position of Figure 2 (and the unclaimed use position of Figure 1). Limitations [1d] and [11d] only recite the position "when the mower is not being used," which is the position shown by the locking structure in Roelle's Figure 2. That locking structure includes the claimed locking mechanism, *i.e.*, pin 68, and its corresponding vertical plate or lug 26 which meets the presently claimed "locking member configured to engage with the locking mechanism and providing a locking structure to cause the locking mechanism to keep the handle at an accommodating position relative to the main body when the gardening tool [mower] is not being used."

80. To the extent the "locking mechanism" and/or "locking member" are construed narrowly to require, for instance, the locking mechanism to be a plate with through-hole(s) like holes 235a, b or c in the Challenged Patent, and/or the locking member to be a pin like pin 241, POSITA would have recognized Outils'

descriptions on pages 9 and 10 to be relevant. There, Outils describes non-illustrated variations saying “it is conceivable to make the lock enter a through-hole in an end piece of the handlebar, thus preventing said handlebar from pivoting at all, or in a through-hole in the handlebar-lock activation tab [see tab 17, Figure 7], thus preventing the handlebar being unlocked by immobilizing said tab.”

TTI1014, 10:4-7. POSITA would have been motivated by these additional suggestions from Outils to use a pin-and-through-hole configuration to implement the locking structure and the locked use and non-use positions taught by Roelle.

81. To the extent the claimed “locking mechanism” is deemed to correspond to the disclosed locking plate 231 and the claimed “locking member” is deemed to correspond to a pin, then POSITA would have understood that the relevant prior art components identified herein can be assigned to the other claim limitation by flipping the above analyses for those claim limitations.

[1e] a control system capable of preventing the motor from being controlled by the operation assembly and halting the motor when the handle is out of the secure position, the control system comprising:

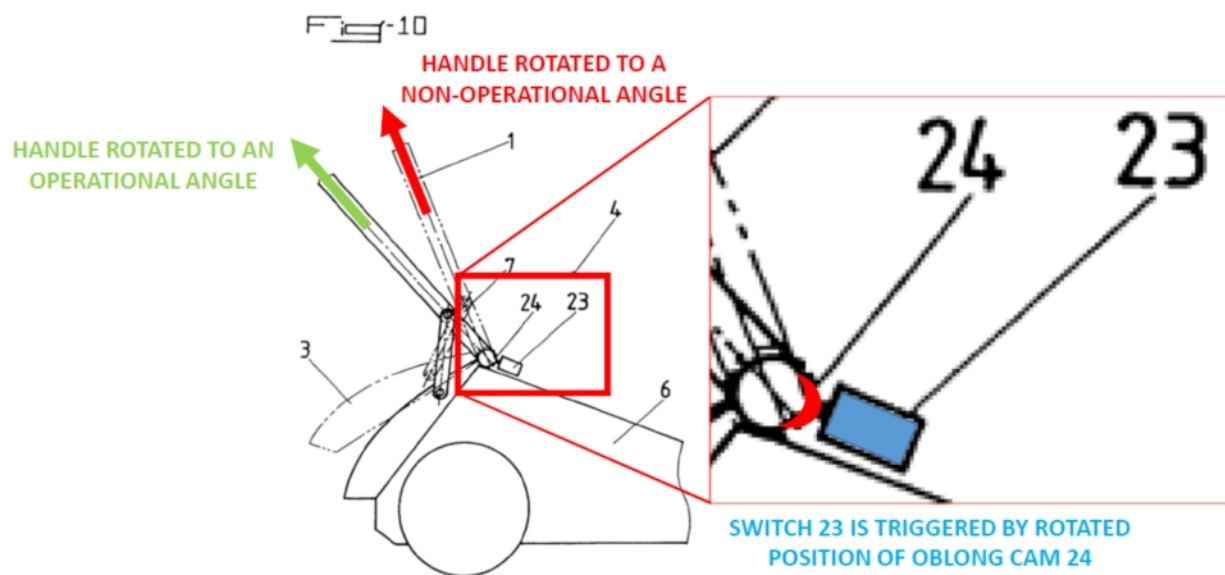
[11e] a control system capable of preventing the motor from being controlled by the operation assembly and halting the motor when the handle is out of the secure position, the control system comprising:

82. Outils discloses several types of control system capable of preventing the motor from being controlled by the operation assembly, and halting Outils' motor when the handle 1 is out of the predetermined secure in-use position.

83. One example is shown in Figure 10 with “an electrical, electromechanical or mechanical activation actuator 23 that interacts with a cam 24 provided on the handlebar 1...” TTI1014, 8:23-24. “In this embodiment, the actuator 23 is acted upon as soon as the handlebar 1 is tilted forward, either with or without the [cut-grass collector's] cover 3 being pivoted upward. Thus, any forward tilting of the handlebar 1 results in action on the actuator 23 by means of cam 24, and thus in the activation of the stoppage of the motor and/or the decoupling and braking of the cutting blade.” *Id.*, 8:25-29. Moreover, Outils' “activation actuators 23 [Figure 10] and 25 [Figure 11] are advantageously similar to the activation actuator 20 [Figure 9]....” *Id.*, 9:10. “The activation actuator 20 can be an electrical supply cut-off switch for an electric motor or for the ignition circuit of a thermal engine.” *Id.*, 7:25-26. Those activation actuators 20, 23, 25 are also “preferably of the all-or-nothing type, that is to say that they allow the

controlled element to be restarted only after they have been interlocked again as a result of their control component returning to the in-use position.” *Id.*, 9:10-13.

POSITA would have interpreted this description as indicating that the “stoppage of the motor” and “braking [halting] of the cutting blade” (*id.*, 8:28) continue until the handle 1 returns to its in-use position with cam 24 properly tripping activation actuator 23. In other words, Outils’ user-operated operation assembly 30 which would otherwise activate the motor does not work until that happens, and likewise the halted motor would remain halted until the mower components were reset.



84. Additional motivation to POSITA for the above obvious modifications would have come from federal regulations that required a walk-behind lawnmower’s blade control system to halt the blade’s motion “within 3 seconds after release of the control.” TTI1008, 1205.05(a)(iii).

[1f] a first control device configured to be controlled by the operation assembly; and

[11f] a first control device configured to be controlled by the operation assembly, and

85. Outils describes its operation assembly (hold-to-run component 30) on handle 1 as controlling “an electrical supply contactor.” *See id.*, 4:5-12. Outils’ “electrical supply contactor” is the claimed “first control device.”

[1g] a second control device configured to be controlled according to the rotating position of the handle wherein, when the handle rotates to a designated position relative to the main body, the second control device unlocks the first control device so that the first control device allows starting of the motor, and, when the handle rotates to the accommodating position relative to the main body, the second control device locks the first device so that the first control device is not allowed to start the motor; and

[11g] a second control device configured to be controlled according to the rotating position of the handle wherein, when the handle rotates to a designated position relative to the main body, the second control device unlocks the first control device so that the first control device allows starting of the motor, and, when the handle rotates to the accommodating position relative to the main body, the second control device locks the first device so that the first control device is not allowed to start the motor, and

86. Outils’ activation actuator 23 in Figure 10 is the claimed “second control device.” Figure 10 shows it disposed proximate to a shaft of the handle 1. It is configured to be controlled according to the rotating position of the handle 1 wherein, when the handle and “cam 24 provided on the handlebar 1” (TTI1014, 8:24) rotate to the designated secure (in-use) position relative to the main body (casing 6), the second control device (activation actuator 23) unlocks the first

control device (electrical supply contactor controlled by hold-to-run component 30) so that the first control device allows starting of the motor. When, instead, handle 1 and cam 24 rotate to the accommodating (non-use) position relative to the main body (casing 6), the second control device (activation actuator 23) locks the first device (electrical supply contactor controlled by hold-to-run component 30) so that the first control device is not allowed to start the motor.

[1h] wherein the second control device comprises at least one of a switch connected to the power supply circuit and a signal source device for sending a control signal to control the motor.

[11h] wherein the second control device comprises at least one of a switch connected to the power supply circuit and a signal source device for sending a control signal to control the motor.

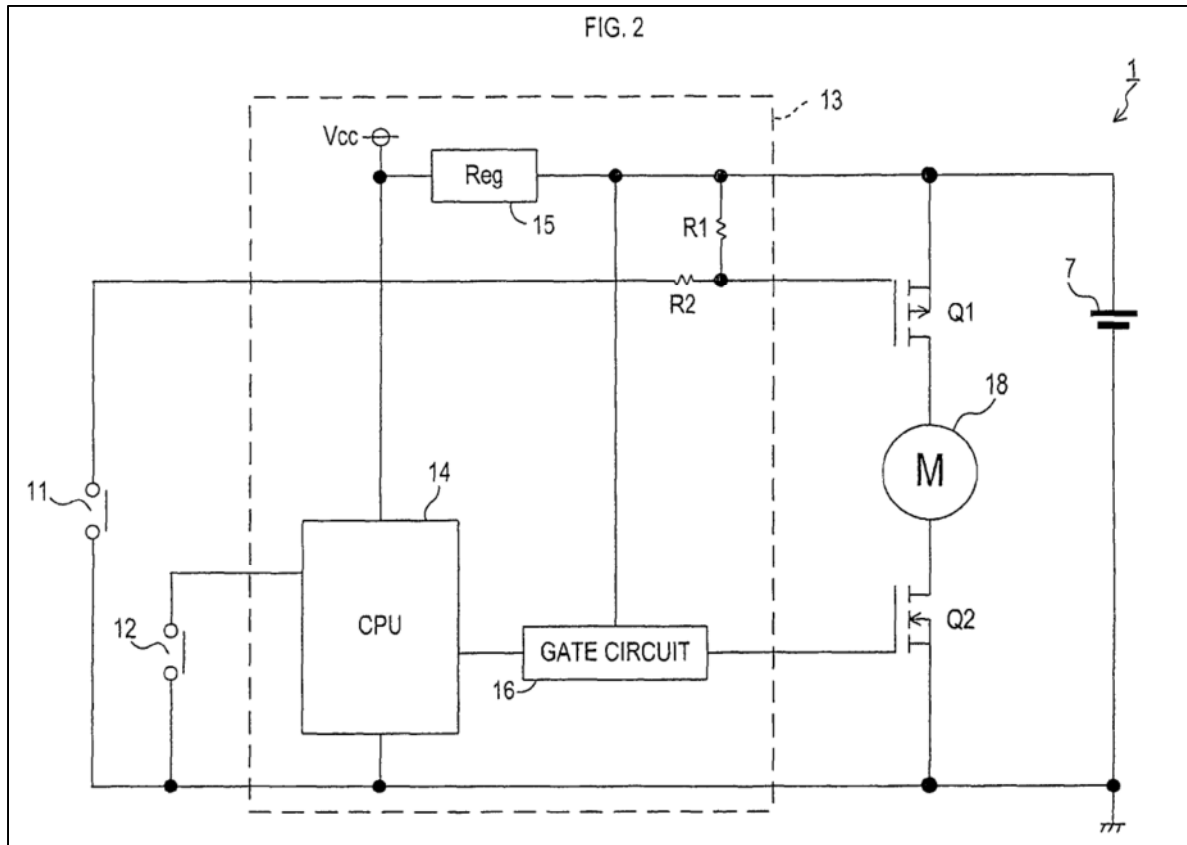
87. Limitations [1h] and [11h] recite two options for the second control device. The obvious combination of Outils with Matsunaga teaches both options.

88. Outils' second control device (activation actuator 23) is described as "advantageously similar to the activation actuator 20" (TTI1014, 9:10) which, in turn, "can be an electrical supply cut-off switch for an electric motor." *Id.*, 7:25. POSITA would have understood this description to mean activation actuator 23 can be a switch connected in the power supply circuit (*e.g.*, in series between the electric power source and the electric motor). However, POSITA would have understood from the disclosure of Matsunaga that it is not desirable to pass the

high current needed to power a lawn mowing motor through contact switches.

TTI1006 (Matsunaga), 1:7-16. Instead, it is preferable to use smaller capacity contact switches (*id.*, 1:15-16) and to avoid the thick wiring (*id.*, 7:23-30) and associated danger of a high current flowing through contact switches. These factors would have motivated POSITA to make an obvious modification to Outils' system by controlling its electrical supply cut-off switch using a separate, low-current circuit with thin wiring lines through which "[o]nly a small current flows for transmitting the ON/OFF state" of contact switches. *See id.*, 7:23-30.

89. In particular, Matsunaga teaches a battery-powered electric lawn mowing device having a circuit (Figure 2) that includes a contact switch (11 or 12) acting as a signal source device for sending a control signal to the power supply circuit. The power supply circuit includes Matsunaga's circuit path from battery 7 through semiconductor switch Q1 to the blade's motor "M," through semiconductor switch Q2 to ground. TTI1006, Figure 2.



90. POSITA would have found it obvious, based on the motivations explained above, to implement Outils' actuation activator 23 (a contact switch triggered by cam 24) as Matsunaga's contact switch 11 which meets the claimed "switch connected to the power supply circuit." Switch 11 also acts as the claimed signal source for sending a control signal to the power supply circuit, namely to semiconductor switch Q1 in the power supply circuit.

91. POSITA would also have found it obvious, based on the motivations explained above, to implement Outils' actuation activator 23 using Matsunaga's

contact switch 12 which meets the claimed switch connected to the power supply circuit, and acts as the claimed signal source for sending a control signal through CPU 14 and gate 16 to switch Q2 in the power supply circuit.

[2a] 2. The gardening tool as recited in claim 1, further comprising an electric power source and a power supply circuit for enabling the electric power source to provide power to the motor

[12a] 12. The mower as recited in claim 11, further comprising an electric power source and a power supply circuit for enabling the electric power source to provide power to the motor

92. Outils' lawnmower uses an electric motor. TTI1014, 3:29; 7:25.

POSITA would have understood that to mean it comprises an electric power source and a power supply circuit for enabling the electric power source to provide power to the motor. POSITA would further have understood all of its embodiments – including that of Figure 10 – likewise to encompass such electric walk-behind lawnmowers.

93. To the extent an electric power source is deemed to be neither disclosed nor inherent in Outils, POSITA would have been motivated by the prevalence of battery powered lawn mowers, by the environmentally clean nature they have over gas-powered mowers, and by the freedom they offer over long electrical cords tethered to a home's wall plug, and thus would have found it

obvious to include an electric power source in Outils' electric lawnmower.

POSITA would also have recognized the necessity of including a power supply circuit to supply power from the source to the motor, and thus would have found it obvious to include one in Outils' lawnmower.

[2b] wherein the control system comprises a switch connected to the power supply circuit to connect the electric power source to the motor or disconnect the electric power source to the motor.

[12b] wherein the control system comprises a switch connected in the power supply circuit to connect the electric power source to the motor or disconnect the electric power source to the motor.

94. Claim 2 can be interpreted to specify that, instead of the “second control device” (which is recited as part of the “control system”) being *either* a switch or a signal source as recited in claim 1[h], the second control device *must* be a switch. Matsunaga's switch 11 or 12 (when used to implement Outils' actuator 23) is connected “to” the power supply circuit to connect/disconnect the electric power source to the motor.

95. To the extent claim 2 encompasses a switch in addition to the switch recited in [1h], POSITA would have found it obvious to include *both* switches 11 and 12, using one in Outils' operation assembly 30 to control the “electrical supply contactor” in the “first control device.” The motivation would have included

adding safety by letting the user activate a low-current switch that controls a high-current switch in the power supply circuit.

96. For claim 12, the switch is met by Matsunaga's switch Q1 or Q2 which is connected "in" the power supply circuit to connect/disconnect the electric power source to the motor.

97. To the extent claim 12 encompasses a switch in addition to the switch recited in [11h], POSITA would have found it obvious to include *both* switches Q1 and Q2, using one as Outils' "electrical supply contactor" in the "first control device." The motivation would have included adding safety by letting the user activate a low-current switch that controls a high-current switch in the power supply circuit.

[3] 3. The gardening tool as recited in claim 2, wherein the switch is mounted to the handle and rotates with the handle synchronously.

[13] 13. The mower as recited in claim 12, wherein the switch is mounted to the handle and rotates with the handle synchronously.

98. For claim 3, Outils' activation actuator 23 (Matsunaga's switch 11 or 12 when combined with Outils) is on the lawnmower's main body 6 and interacts with the oblong cam 24 mounted to the handle. POSITA would have found it obvious to swap their locations such that the switch is mounted to the handle and rotates synchronously with it. This modification would have entailed the simple

substitution of one component for the other; it would have employed known techniques for mounting those components; it would have been obvious to try since there is a finite number (two) of variations; and swapping their location would have had a predictable result and a reasonable expectation of success.

POSITA would have recognized that electrical signal lines between the operation assembly 30 and motor are already within Outils' handle, so putting the cut-off switch on the handle would have simplified routing of electrical wires.

99. In addition, as explained for claim 2, using the other of Matsunaga's switches 11 and 12 to implement Outils' operation assembly 30 would motivate POSITA to mount that switch 11 or 12 ergonomically on Outils' handle such that the switch rotates synchronously with it.

100. For claim 13, POSITA would have found it obvious to mount the high-current switch Q1 or Q2 to Outils' handle. POSITA would have understood that such a design employed known techniques for mounting such switches, *e.g.*, attaching them to an electrically insulated enclosure and mounting such enclosure by bolts or other mechanism; it would have been obvious to try since there is a finite number of variations (either the handle or the main body); and mounting it to the handle would have had a predictable result and a reasonable expectation of success. POSITA would have also recognized that the switch Q1 or Q2 could be

mounted on the handle near the main body such that it remains distal from the user during use.

101. In addition, as explained for claim 12, using the other of Matsunaga's switches Q1 and Q2 to implement Outils' electrical supply contactor would have motivated POSITA to mount that switch to Outils' handle for the same reasons as set forth in the preceding paragraph.

[4] 4. The gardening tool as recited in claim 2, wherein the switch is mounted to the main body and the handle rotates relatively to the switch.

[14] 14. The mower as recited in claim 12, wherein the switch is mounted to [the] main body and the handle rotates relatively to the switch.

102. For claim 4, Matsunaga's switch 11 or 12 would be used as Outils' actuator 23 which is mounted to Outils' main body. TTI1014, Figure 10. POSITA would have been motivated by Outils' design to mount Matsunaga's switch in the same location such that the handle rotates relatively to the switch.

103. In addition, for claim 4, the obvious use of Matsunaga's other switch 11 or 12 to implement Outils' operation assembly 30 would have motivated POSITA to mount the switch to either the handle or the main body. POSITA would have understood that either location employed known techniques for mounting such switches, *e.g.*, attaching them to an electrically insulated enclosure and mounting such enclosure by bolts or other mechanism; it would have been

obvious to try since there is a finite number of variations (either the handle or the main body); and mounting it to the main body would have had a predictable result and a reasonable expectation of success. POSITA would have also recognized that the switch 11 or 12 could be connected by pull-wire cable 29 to the operation assembly 30 so that the assembly 30 remains at an ergonomic location for the user. TTI1006, 4:6-7.

104. For claim 14, POSITA would have found it obvious to mount the high-current switch Q1 or Q2 to Outils' main body. POSITA would have understood that such a design employed known techniques for mounting such switches, *e.g.*, attaching them to an electrically insulated enclosure and mounting such enclosure by bolts or other mechanism; it would have been obvious to try since there is a finite number of variations (either the handle or the main body); and mounting it to the main body would have had a predictable result and a reasonable expectation of success. POSITA would have also recognized that the switch Q1 or Q2 could be mounted on the main body such that it remains distal from the user during use.

105. In addition, as explained for claim 12, using the other of Matsunaga's switches Q1 and Q2 to implement Outils' electrical supply contactor would have

motivated POSITA to mount that switch to Outils' main body for the same reasons as set forth in the preceding paragraph.

[5a] 5. The gardening tool as recited in claim 1, further comprising an electric power source and a power supply circuit for enabling the electric power source to provide power to the motor

[15a] 15. The mower as recited in claim 11, further comprising an electric power source and a power supply circuit for enabling the electric power source to provide power to the motor

106. See analysis for claims [2a] and [12a].

[5b] wherein the control system comprises a signal source for sending a control signal to the power supply circuit to disconnect the electric power source to the motor.

[15b] wherein the control system comprises a signal source for sending a control signal to the power supply circuit to disconnect the electric power source to the motor.

107. See the analysis for claims [1h] and [11h] for the obviousness of using Matsunaga's switch 11 or 12 as Outils' activator 23. In the resulting combination, switch 11 or 12 acts as a signal source by sending a control signal to switch Q1 or, for switch 12, to CPU 14 which, in conjunction with gate circuit 16, signals switch Q2. Switch 11 or switch 12 are connected "to" the power supply circuit to connect/disconnect the power source and motor.

108. In addition, if switch 12 were used to implement Outils' activator 23, then CPU 14 and gate circuit 16 would also constitute the claimed "signal source...."

[6] 6. The gardening tool as recited in claim 5, wherein the signal source is mounted to the handle and rotates with the handle synchronously.

[16] 16. The mower as recited in claim 15, wherein the signal source is mounted to the handle and rotates with the handle synchronously.

109. The analysis for claim [3] explains the obviousness of mounting Matsunaga's switch 11 or 12 on Outils' handle. POSITA would have undertaken the same analysis for claims 6 and 16 since Matsunaga's switch 11 or 12 acts as the claimed signal source.

[7] 7. The gardening tool as recited in claim 5, wherein the signal source is mounted to the main body and the handle rotates relatively to the signal source.

[17] 17. The mower as recited in claim 15, wherein the signal source is mounted to main body and the handle rotates relatively to the signal source.

110. The analysis for claim [4] explains the obviousness of mounting Matsunaga's switch 11 or 12 on Outils' main body. POSITA would have undertaken the same analysis for claims 7 and 17 since Matsunaga's switch 11 or 12 acts as the claimed signal source.

X. GROUND 2: CLAIMS 8-10, 18-20 ARE OBVIOUS UNDER AIA 35 U.S.C. § 103 OVER OUTILS, ROELLE, MATSUNAGA, FURTHER

**IN VIEW OF LANGDON (U.S. 5,209,051) AND NAKANO
(WO2013/122266A2).**

111. Langdon (TTI1012) published May 11, 1993, and Nakano (TTI1015) published August 22, 2013, each before the earliest foreign priority date of October 10, 2013, claimed by the '26686 patent. Each qualifies as prior art under AIA 35 U.S.C. §102(a)(1) and Langdon also under (a)(2). Neither was cited in the '26686 patent or prosecution history.

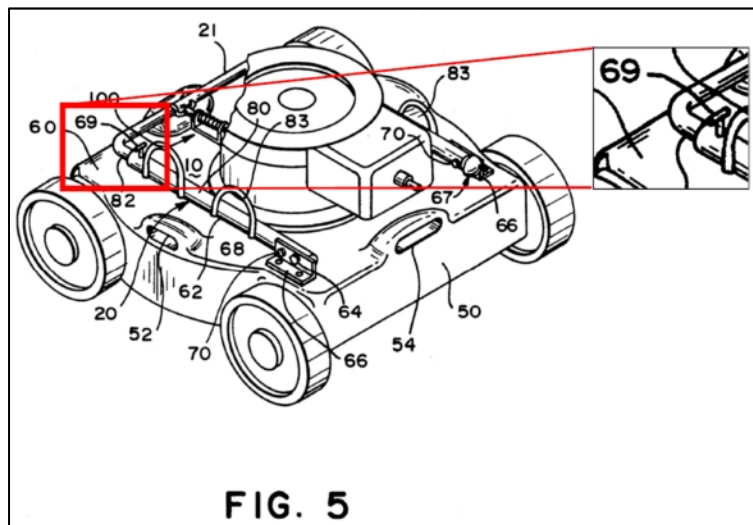
[8a] 8. The gardening tool as recited in claim 1, wherein the handle comprises a plurality of telescopic members for connecting the operation assembly to the main body, and

[18a] 18. The mower as recited in claim 11, wherein the handle comprises a plurality of telescopic members for connecting the operation assembly to the main body, and

112. Outils' lawnmower uses a U-shaped handle illustrated in Figures 1 and 5. POSITA would have observed the height and length of its footprint and, motivated by the fact that users usually store lawnmowers in garages, sheds and other small places, and that users and retailers prefer smaller shipping boxes, would have been motivated to let Outils handle become smaller during non-use.

113. Langdon teaches a similar U-shaped lawnmower handle that has a plurality of telescopic tubes 62, 82. One telescopic tube 82 extends from the other tube 62 with a "spring biased pin [69] to lock the handles in [an] operative push position." *Id.*, 4:6-8; Figure 5. POSITA would have understood the "push

position” to be an extended (telescoping) position of one telescopic tube relative to the other; Figure 5 shows the collapsed handle rotated against the lawnmower’s main body but POSITA would have understood the “push position” to be a raised angular position not shown in Langdon’s drawings.



114. POSITA would have been motivated by the collapsibility of Langdon’s telescopic handle, and by the fact that it does not have to be removed from the lawnmower body, and would have found it obvious to use that feature in Outils’ lawnmower. POSITA would have recognized the advantage of collapsing Outils’ handle to make the lawnmower easier to ship and store.

115. In addition, POSITA would have observed that Outils’ operation assembly is ergonomically located on the handle assembly near the user during

use, such that the obvious modification using Langdon's telescoping design would have connected the operation assembly to the lawnmower's main body, as claimed.

[8b] wherein, when a one of the plurality of telescopic members extends to the designated position relative to another of the plurality of telescopic members, a third control device unlocks the first control device so that the first control device is capable of starting the motor, and, when the one of the plurality of telescopic members is in a position other than the designated position, the third control device locks the first control device so that the first control device is not capable of starting the motor.

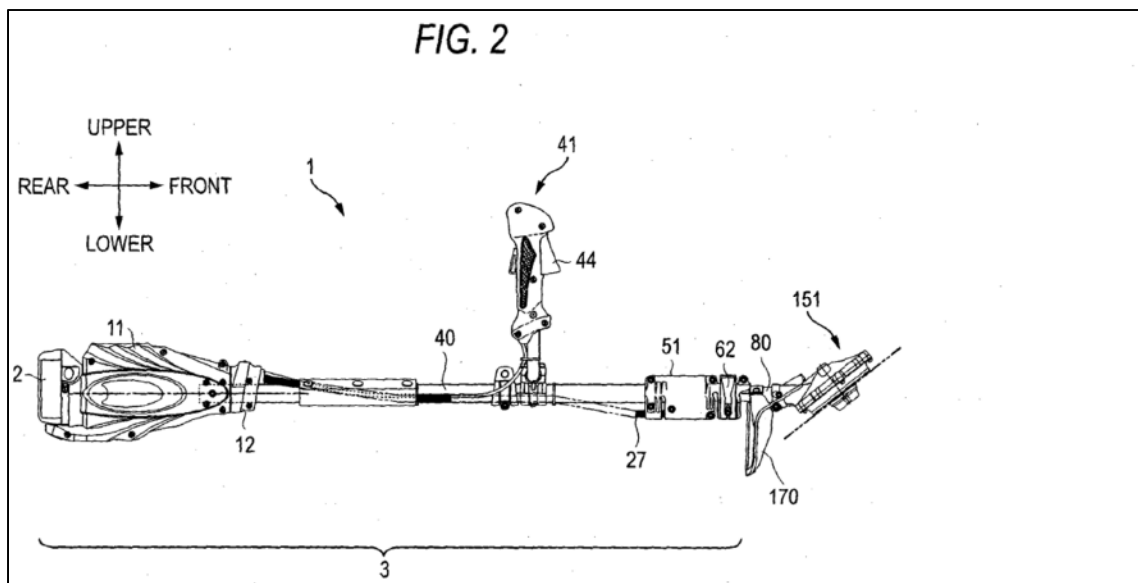
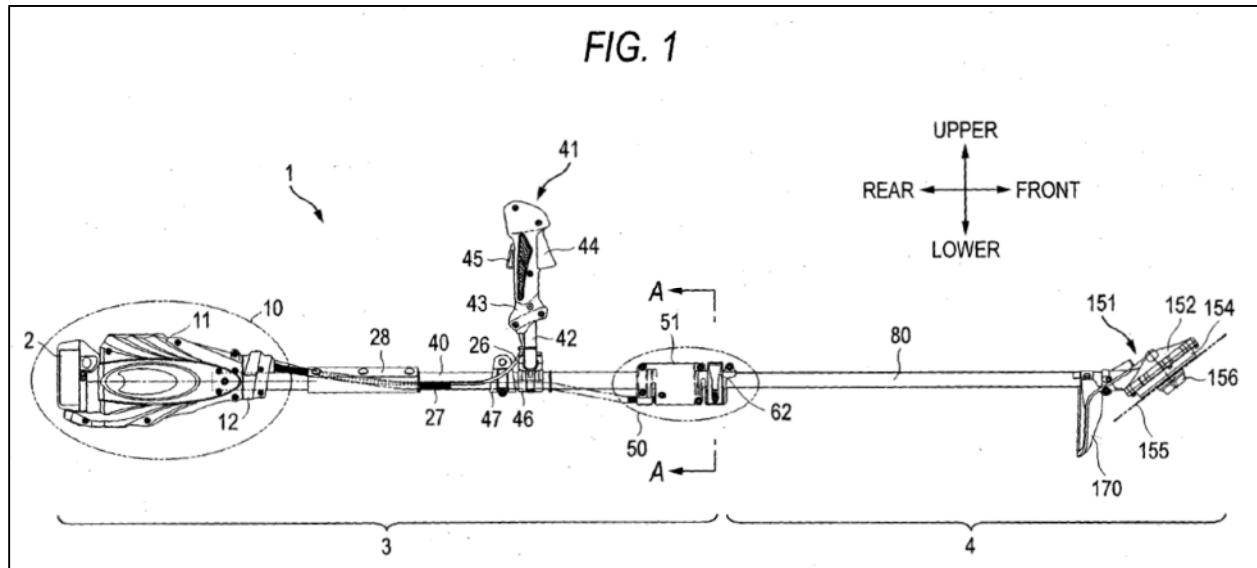
[18b] wherein, when a one of the plurality of telescopic members extends to the designated position relative to another of the plurality of telescopic members, a third control device unlocks the first control device so that the first control device is capable of starting the motor, and, when the one of the plurality of telescopic members is in a position other than the designated position, the third control device locks the first control device so that the first control device is not capable of starting the motor.

116. These claims contain several unclear limitations, such as referring to “the designated position” as an extended *telescopic* position despite parent claims 1 and 11 defining it as a *rotational* “designated position.” This petition applies the prior art to these claims as best the claims can be understood.

117. Like Outils and Langdon, Nakano teaches a telescoping handle on a grass cutting tool. Nakano shares Langdon's goal of collapsing the handle “to realize a compact electric bush cutter capable of reducing a storage space thereof” (TTI1015 (Nakano), 3:3-4), but provides added safety where, “if retraction of a rod

[i.e., collapse of the telescoping handle] by a certain cause is detected while a work is performed in an extended state of the rod, a motor is immediately braked, thereby improving a safety thereof.” *Id.*, 4:2-4. Nakano improves safety of a telescoping handle by detecting whether it has partially collapsed, and braking/disabling the grass cutter’s motor accordingly.

118. Nakano’s telescoping handle includes a “pipe 40” with a “handle unit 41” and its trigger 44. *See* TTI1015, Fig. 1. A “movable pipe 80” is slidably connected “to be moved relative to the fixed pipe 40 in the front-rear direction.” *Id.*, 7:22-24. A holder 51 where the pipes mate helps to fix their length in the front-rear direction. *Id.*, 9:8-10. Pipe 80 fits within pipe 40 (*see* Figs. 4 and 5) much like Langdon’s tube 62 fits within tube 82, such that they constitute telescoping members. What results is a handle that is adjustable between an extended length (Figure 1 below) and a retracted length (Figure 2). *Id.*, 5:25-6:4.



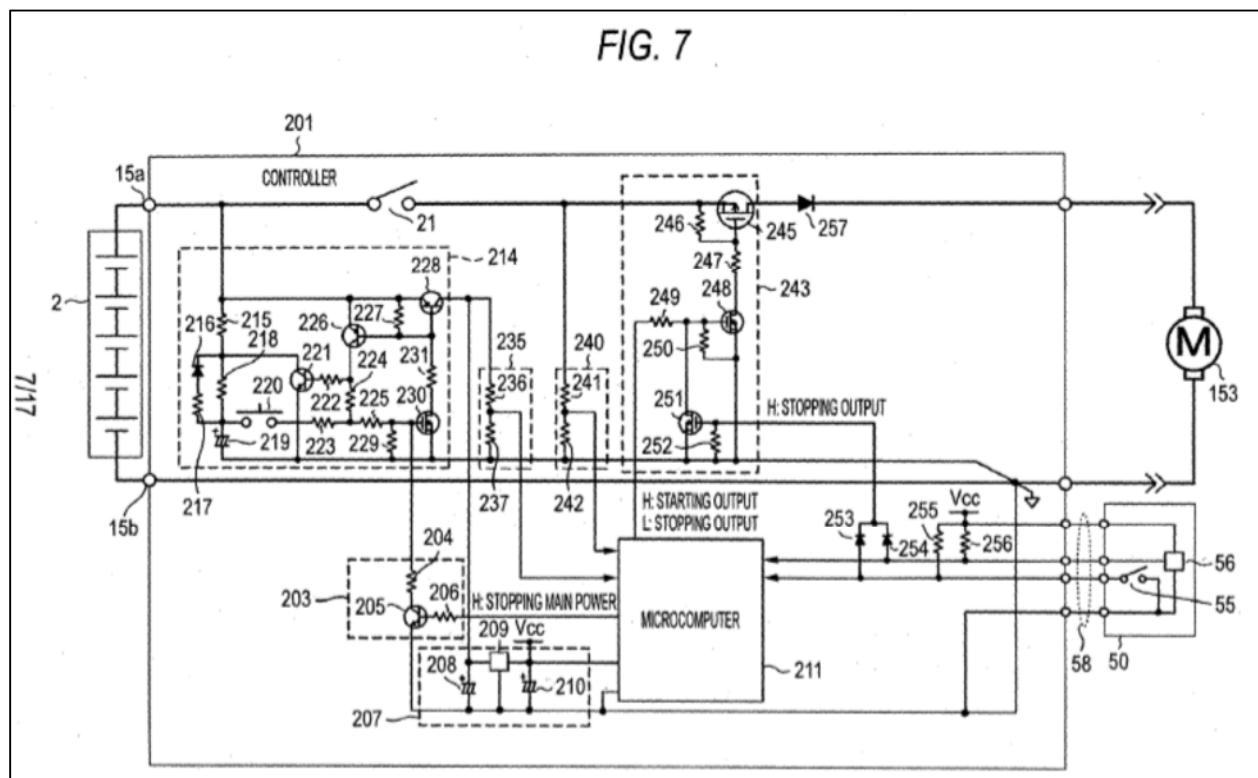
119. As explained below, Nakano is operable “in a state in which the movable pipe 80 is most extended from the fixed pipe 40, as shown in Fig. 1.” TTI1015, 9:15-16. “Also, the holder 51 is provided with an extended detection unit as described later, and thus the driving unit 151 [of blade 155] is configured

not to be operated when the movable pipe 80 is not fully extended (e.g., a non-extended state). In addition, if the movable pipe 80 is not completely fixed or the movable pipe 80 is retracted due to a certain cause during bush cutting work, the driving unit 151 is configured to automatically stop a rotating operation thereof.” *Id.*, 9:16-22.

120. POSITA would understand that Nakano’s telescoping handle resembles Langdon’s, and that Nakano adds several control devices that meet this Challenged Claim: among them is switch 55, Hall IC 56, and control circuit 12 or microcomputer 211, each of which enables/disables (*i.e.*, the claimed actions of “unlocks” and “locks”) the user’s operation assembly, *i.e.*, trigger lever 44, from activating the motor that controls cutting blade 155. The operation assembly is unlocked when it and tube 40 extend to a designated in-use position, and locked when it and tube 40 slide (retract) away from that position toward the main body containing the blade. They also halt the motor via stop circuit 243/343. TTI1015, 24:13-18; 25:9-14; 26:3-12; Figures 7, 11. Note that Nakano’s motor, like Outils’ and Landgon’s, is within a main body (motor case 152) for the cutting blade 155. *Id.*, 11:7-8. And Nakano inserts a “curled cord 35” within the hollow telescoping pipes (like Langdon’s) “to supply an electric power for driving the motor from the

circuit board 13 to the motor (see Fig. 1).” *Id.*, 12:15-19; Figs. 1, 3. POSITA would thus have found their designs to compatible for obvious combination.

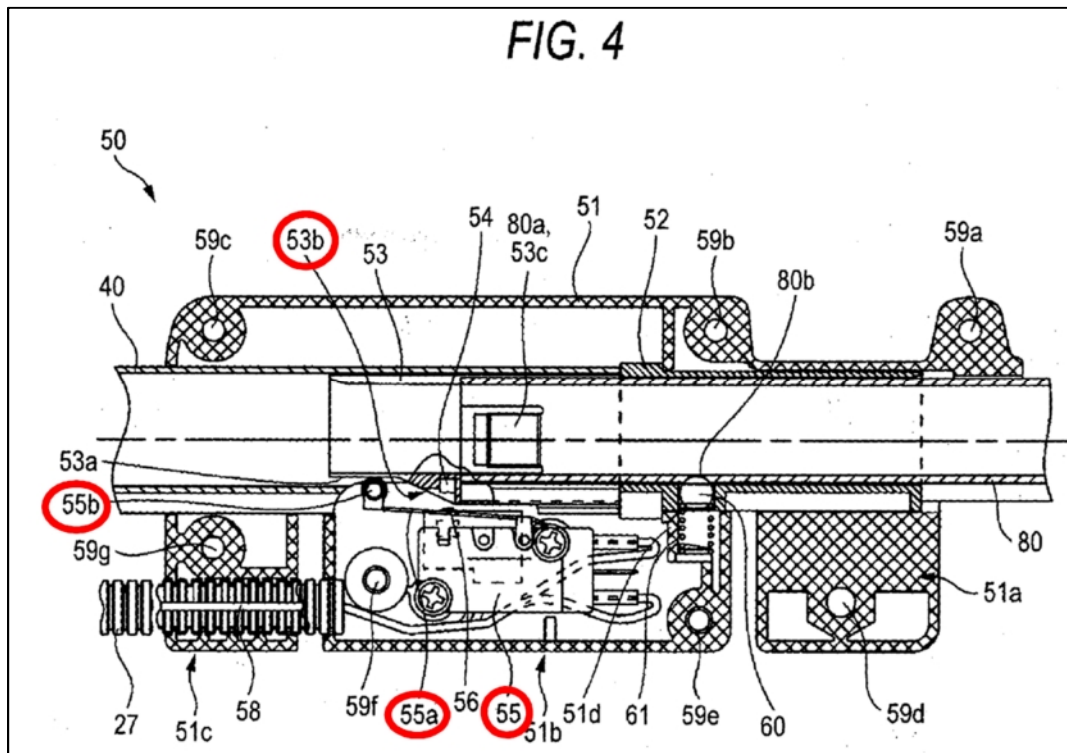
121. **Switch 55:** The claimed third control device reads on Nakano’s switch 55, with controlled switch 245/345, that is triggered by an inclined surface 53b (Fig. 4) at the end of movable pipe 80. In Figure 4, the inclined surface 53b is detected by a round pulley 55b pressing against the exterior of pipe 80 by a resilient lever 55a. The lever 55a is, in turn, configured to turn switch 55 on/off. TTI1015, 18:12-13. Switch 55 is connected via microcomputer 211, and via diode 253, to a power supply circuit, e.g., to the path between an electric power supply (Nakano’s battery pack 2) and motor “M.” *Id.*, 6:13-25; 25:9-14; Figures 7, 11.





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trigger 44/21 and switch 55 permit power to reach the motor. TTI1015, 18:6-18, 9:8-16⁵;



123. If, instead, pipe 80 retracts into pipe 40 to a non-operational length, pulley 55b is pushed axially outward against the full outer diameter of pipe 80, causing lever 55a to trip switch 55 to its other state and send a signal to

⁵ Nakano is occasionally inconsistent, sometimes saying switch 55 is “on” when pulley 55b is within recess 53a, and other times “off.” Regardless, POSITA would know to implement Nakano’s circuitry to allow motor activation when the pipes 40, 80 are at their in-use position, and disallow activation when they are retracted.

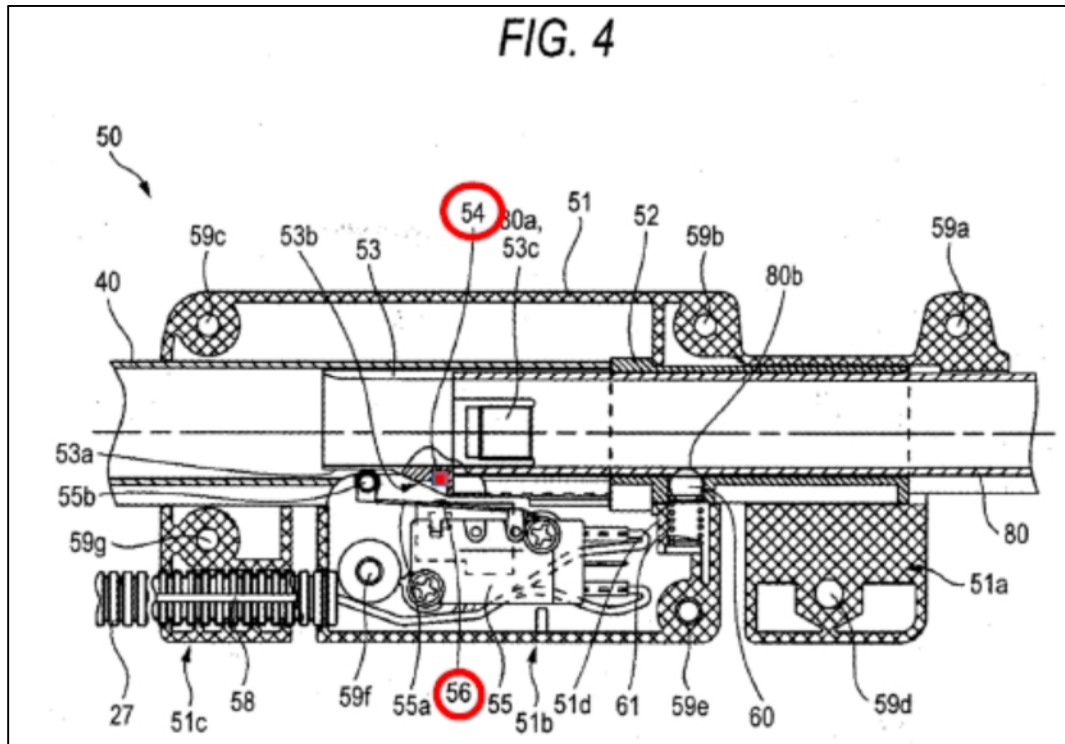
microcomputer 211 disabling switch 245/345 in the power supply circuit.

TTI1015, 18:6-18, 9:8-16.

124. The embodiment in Figures 4 and 5 uses “a mechanical switch 55, such as a microswitch.” TTI1015, 18:11-12. But Nakano makes clear that the detection of pipe 80’s extension can be done “by any detecting methods, such as electrical, mechanical, or optical method and output the corresponding electric signals to a control unit (controller) mounted on the circuit board 13.” *Id.*, 18:9-11. POSITA would have understood this to be a suggestion to use active component(s), such as an optical photodetector, to determine when pipe 80 is at an operational or non-operational length. *See id.*, 18:17-18; 19:24-20:2; 25:11-14; Figure 3.

125. **Hall IC 56:** The claimed third control device reads on Nakano’s Hall IC 56 (with controlled switch 245/345) on fixed pipe 40 to detect the proximity of a magnet 54 on pipe 80. *See* annotated Figure 4 below. Hall IC 56 is connected via microcomputer 211, and via diode 254, to a power supply circuit (see stop circuit 243/343), i.e., to the path between an electric power source (Nakano’s battery pack 2) and the motor “M.” TTI1015, Figures 7, 11. A voltage potential, “which is the output of the Hall IC 56 ... becomes Low when the movable pipe 80 is extended from the fixed pipe 40 to the predetermined position, and becomes

High when the movable pipe 80 is not extended. ... when the movable pipe 80 is not extended from the fixed pipe 40 to the predetermined position ... the output from the output stop circuit 243 is stopped, thereby stopping supplying of an electric power to the motor 153. As described above, according to the present embodiment, in addition to microcomputer 211 being configured to control the output stop circuit 243 depending on the outputs of the rod extension sensors as the extending detection unit, the outputs of the rod extension sensors are directly transmitted to the output stop circuit 243. Accordingly, supplying of an electric power to the motor 15 is surely stopped when the rod has been retracted from the extended state or is retracted during operation. Also, if the signal line 58 is disconnected or an output of any one of the sensors is different from that of the other, the microcomputer 211 serves as an abnormal detection unit for detecting an abnormal state [] thereby stopping the motor 153.” *Id.*, 25:21-26:12; Figures 7, 11.



126. **Microcomputer 211:** The claimed third control device reads on Nakano's microcomputer 211 (with controlled switch 245/345) which, based on signal(s) received from switch 55 and/or Hall IC 56, sends a High or Low control signal to switch 245/345 and/or stop circuit 243 to enable or disable activation of the motor by the user-operation operational assembly. Microcomputer 211 is connected to a power supply circuit, *i.e.*, to the path between an electric power source (Nakano's battery pack 2) and the motor "M." TTI1015, Figures 7, 11. "The output stop circuit 243 is a circuit for forcibly stopping rotation of the motor 153 under the control of the microcomputer 211, even when the switch 21 is turned on." *Id.*, 24:6-8. "The output stop circuit 243 is provided with a FET 245 for

stopping an output.” *Id.*, 24:23. “When the High signal is outputted from the microcomputer, the FET 248 becomes a conductive state so that the gate signal of the FET 245 becomes a predetermined voltage to turn the FET 245 on. Thus, rotation of the motor 153 is started by pulling the switch 21. On the contrary, if the Low signal is outputted from the microcomputer 211, the FET 248 is turned off so that the gate signal of the FET 245 becomes zero to turn the FET 245 off. As a result, the motor 153 is not rotated even if the switch 21 is pulled. Accordingly, when a certain situation occurs during rotation of the motor 153, the microcomputer 211 can output the Low signal to the output stop circuit 243 to stop the motor 153.” *Id.*, 25:3-11.

[9a] 9. The gardening tool as recited in claim 8, further comprising an electric power source and a power supply circuit for enabling the electric power source to provide power to the motor

[19a] 19. The mower as recited in claim 18, further comprising an electric power source and a power supply circuit for enabling the electric power source to provide power to the motor

127. See analysis of claims [2a] and [12a].

[9b] wherein the control system comprises a switch and a signal source, the switch is configured to be triggered by the operation assembly to activate the motor, and the signal source sends a signal to the power supply circuit to disable the activation of the motor when the one of the plurality of telescopic members is caused to be move[d] away from the predetermined position relative to the another of the plurality of telescopic members.

[19b] wherein the control system comprises a switch and a signal source, the

switch is configured to be triggered by the operation assembly to activate the motor, and the signal source sends a signal to the power supply circuit to disable the activation of the motor when the one of the plurality of telescopic members is caused to be move[d] away from the predetermined position relative to the another of the plurality of telescopic members.

128. The claimed “switch” is met by Outils’ “electrical supply contactor” triggered by operation assembly (“hold-to-run component 30” and “remote control cable 29, which acts on ... an electrical supply contactor...” (TTI1014, 4:5-7)). POSITA would have understood the electrical supply contactor to be a high-current switch connected in the power supply circuit (*e.g.*, in series between the electric power source and the electric motor).

129. As addressed for claims 8[b] and 18[b], the claimed signal source is met by Nakano’s switch 55 which acts as a signal source by sending a signal through microcomputer 211 and diode 253 to control switch 245/345 in the power supply circuit. The claimed signal source is also met by Hall IC 56 which sends a similar signal through microcomputer 211 and diode 254 to control switch 245/345. The claimed signal source is also met by microcomputer 211 which sends a signal to control switch 245/345. Each of these components, when incorporated into Outils’ modified system, sends a signal to the power supply circuit to disable activation of the motor when one of the telescopic members 40, 80 moves away from the predetermined in-use position relative to the other telescopic member.

[10a] 10. The gardening tool as recited in claim 8, further comprising an electric power source and a power supply circuit for enabling the electric power source to provide power to the motor

[20a] 20. The mower as recited in claim 18, further comprising an electric power source and a power supply circuit for enabling the electric power source to provide power to the motor

130. See analysis of claims [2a] and [12a].

[10b] wherein the control system comprises a plurality of signal sources for sending a signal to the power supply circuit to control the connection between the electric power source and the motor, the plurality of signal sources enable the operation of the operation assembly to the motor when the one of the plurality of telescopic members is caused to move to a predetermined position relative to another of the plurality of telescopic members and the one of the plurality of signal sources disable the operation of the operation assembly to the motor when the one of the plurality of telescopic members is caused to be move[d] away from the predetermined position relative to the another of the plurality of telescopic members.

[20b] wherein the control system comprises a plurality of signal sources for sending signal to the power supply circuit to control the connection between the electric power source and the motor, the plurality of signal sources are capable of enabling the operation of the operation assembly to the motor when the one of the plurality of telescopic members is caused to move to a predetermined position relative [to] another of the plurality of telescopic members and the one of the plurality of signal sources is capable of disabling the operation of the operation assembly to the motor when the one of the plurality of telescopic members is caused to be move[d] away from the predetermined position relative to the another of the plurality of telescopic members.

131. As addressed for claims [1h], [11h], [8b] and [18b], the claimed plurality of signal sources is met by (1) Matsunaga's switch 11 or 12 used as Outils' activator 23 to send a control signal to the "electrical supply contactor"; (2)

Declaration of E. Smith Reed – '26686 Patent

Nakano's switch 55 which sends a control signal that reaches switch 245/345 in the power supply circuit; (3) Nakano's Hall IC 56 which sends a control signal that reaches switch 245/345 in the power supply circuit; and (4) Nakano's microcomputer 211 which sends a signal to switch 245/345 in the power supply circuit. Each of these components, when incorporated into Outils' modified system, is capable of enabling the operation of the operation assembly to activate the motor when a telescopic member is caused to move to its predetermined in-use position relative to the other telescopic member, and to disable such operation when caused to be moved (retracted) away from that position.

XI. CONCLUSION

I hereby declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct, and that all statements made of my own knowledge are true and that all statements made on information and belief are believed to be true. I understand that willful false statements are punishable by fine or imprisonment or both. *See* 18 U.S.C. § 1004.

Date: 4/30/2020

By: 
E. Smith Reed, P.E.

EXHIBIT A

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to in machine and product design, manufacture, service and operation, based on over 30 years of consumer
Present and industrial product design and production experience. Mr. Reed is a Board Certified Diplomat in
Forensic Engineering, certified through the National Academy of Forensic Engineers (NAFE) in
accordance with the requirements and guidelines set forth by and accredited by the Council of
Engineering and Scientific Specialty Board (CESB).

Typical issues evaluated:

- * Adequacy of Design and the Design Processes
- * Control of Quality and Manufacturing Processes
- * Reliability and Durability
- * Guards, Shields and Interlocks
- * Human Factors, Layouts, Instructions, Warnings
- * Accidents (non-highway) and their Reconstruction
- * Patent Disputes

Typical products and machines investigated:

- * Lawn & Garden and Turf Care Equipment
- * Agricultural Equipment
- * Industrial and Off-Road Vehicles
- * Institutional Equipment
- * Industrial and Production Machinery
- * Wheeled Equipment
- * Specialty Machinery

Industrial Experience:

1968 **HONEYWELL, INC.,** Minneapolis, MN
to *Production Engineer*

1970 Responsible for high volume mechanical assembly line incorporating various automatic electro-mechanical machines to assemble mechanical products utilizing some 20 components per unit.

- * Developed, installed, tested, de-bugged, wrote operator & service manuals for and set into production automatic multi-work-station assembly machinery.
- * Supervised placement of machinery into assembly line and managed the machines' and production line's routine operation.
- * Safety engineered reciprocating and rotational nip-point barrier guards. Identified needs, selected placement, size, shape and materials and evaluated effectiveness and production influence.
- * Developed and placed hazard notification and operator warning signs. Formulated wording and general design and managed procurement and placement on machines.
- * Authored operator & maintenance manuals for three different types of production machines.
- * Conducted fail-safe analyses. Examined numerous potentially dangerous machine conditions and initiated design revisions and redesigns to incorporate more "operator-safe" features.

1970 **THE TORO COMPANY,** Minneapolis, MN
to *Design Engineer / Sr. Design Engineer / Chief Product Engineer*

1979 Responsible for organizing and executing product design projects with coordination between marketing, production and customer service groups. Responsible for engineering of industrial gang mowers, tractors, three-wheeled triplex power mowers (both mechanical and hydraulic drive), three-wheeled

utility vehicles and trailer type turf sweepers. In addition, was involved with design reviews of consumer mowers, garden tillers, tractors and snow throwers.

- * Designed industrial turf sweepers, engine driven as well as agricultural P.T.O. version.
- * Initiated and helped direct product recall on turf verti-cutter/thatcher machine. Redesigned cutting head to eliminate hazard and helped implement field replacement program.
- * Designed industrial gang type pull-behind reel mowers. Recipient of J. F. Lincoln Foundation award for designs.
- * Redesigned hydraulic driven three-wheeled triplex mower for improved reliability, easier operation and more ergonomic operator controls. Introduced reliable operator presence safety interlock system (OPC) as well as other hydraulic and mechanical safety features.
- * Conducted study and determined passenger capacities and cargo load limits on three-wheeled utility vehicle.
- * Directed design changes on a mechanical driven three-wheeled mower for improved stability, brakes, operator controls and operation instructions.
- * Directed testing, evaluation and design improvements for turf tractor brakes.
- * Investigated and evaluated several severed finger and lacerated hand mower accidents. Determined mower design contribution to these and other accidents. Conducted study to identify design improvements and completed redesign for reduction of such accidents.
- * Investigated and evaluated three-wheeled utility vehicle tip-over accidents, industrial tractor brake failures and unattended Diesel tractor "start-ups". Initiated or influenced appropriate design changes or literature changes as a result.
- * Designed and composed warning labels and operating and service manuals for all assigned products.

1979 **TENNANT COMPANY, Minneapolis, MN**
to *Engineering Manager / Chief Engineer, Test & Reliability*
1985

Responsible for or intimately involved with design or testing of three- and four-wheeled walk-behind and ride-on automotive type powered sweepers and scrubbers used in warehouses, manufacturing plants, shopping centers, parking ramps, and other hard surface areas (machines such as those described in SAE Standard J2130-2, Figures 2 and 3).

As Engineering Manager, responsible for engineering of self-propelled riding and walk-behind floor sweepers, assuring development of new products and designs. Managed design group as well as electrical and hydraulic engineering groups. As Chief Engineer, Test & Reliability, responsible for engineering testing and evaluation of all motorized industrial sweepers, scrubbers and scarifiers.

- * Directed the design projects of two new sweepers (\$7,000 and \$13,000 price ranges (1984 dollars)).
- * Tested machines to assure that their performance, reliability and safety met requirements and expectations for the duration of the product's life.
- * Responsible for creating / assuring that all labels and manuals met safety requirements.
- * Developed and executed companywide "Product Reliability Plan".
- * Was instrumental in reorganizing company's Product Safety Review Council and co-authored its policies, practices and procedures.
- * Helped re-write philosophy of Engineering Test Department, reaffirming and strengthening requirements for approving products prior to manufacturing and sales.

- * Directed activities to obtain independent testing lab (UL & FM) approvals for manufacture and shipment of company's products.
- * Was Engineering Department's representative on corporate Quality Team.
- * Evaluated operator injury claim of hearing loss due to operating excessively noisy equipment. Evaluated gasoline and LP gas powered machine fires and resulting damage.

1985
to
1987

VERMONT CASTINGS, INC., Randolph, VT

Vice President, Engineering

Managed Engineering, Tooling and Quality Control Departments for design, development, testing, emissions and safety certification, tooling, production and quality control of wood and coal burning parlor stoves and room heating appliances.

- * Directed fire safety tests on Vt. Cstgs. and competition heating appliances in various room installation situations. Directed and coordinated safety testing conducted by UL labs.
- * Directed testing and evaluation of creosote build-up in both metal and masonry chimneys used in conjunction with fireplaces and parlor stoves. Tested heat effects and building structural degradation of overheated stove & chimney pipes and chimney fires.
- * Evaluated home fire accident claims related to stoves, chimneys and other heat sources.
- * Established and implemented Quality Assurance plan. Established philosophy assuring that all products, including warning labels and manuals, met all safety and quality requirements.
- * Managed the creation of the Jigs & Fixtures Tooling Department for metal fabrication.
- * Established formal corporate management product review process to assure products met marketing, manufacturing and safety objectives prior to first production and first shipments.
- * Directed several product development programs resulting in the successful release and production of two major and several other new products.
- * Managed the joint venture development of a "Zero Clearance" pre-fabricated fireplace product. Assured that all safety requirements, including clearances and venting, were met.

1987
to
1989

LOZEAU & SON, INC., Lebanon, NH

Owner, General Manager

Owned and managed building materials distributorship and construction work crews with 8 to 14 employees.

1990
to
1993

CENTRICUT, INC., Lebanon, NH

Vice President, Engineering / Quality Control

Responsible for Engineering and Quality Assurance Departments for this metal cutting tool component company. Responsible for product design, tooling, assembly processes, control of quality and coordination and match-up with mating machines with which products were used.

- * Determined the objective of and managed the re-engineering of over 200 products.
- * Using Reverse Engineering techniques, designed, developed and released an additional seven new product lines encompassing over 85 new products.
- * Created and managed Quality Assurance Department. Guided the establishment of quality and performance standards.
- * Created and guided the functions of manufacturing engineering. Managed the assurance of safety with regard to production equipment and facilities.

- Education & Honors:**
- * BSME, University of Arkansas, 1968 (Dean's List)
 - * Recipient of four U.S. Patents
 - * Award winner, Lincoln Arc Welding Foundation, 1976
- Registrations:**
- * Licensed Registered Professional Engineer (Minnesota, New Hampshire, Vermont)
- Professional Organizations:**
- * American Society of Mechanical Engineers
 - * National Society of Professional Engineers
 - * National Academy of Forensic Engineers (past President)
 - * American Society of Agricultural and Biological Engineers
 - * (past member) Human Factors and Ergonomics Society
 - * (past member) Society of Automotive Engineers
 - * (past member) American Society of Quality
 - * (past member) Society of Manufacturing Engineers
 - * (past member) American Society of Safety Engineers
- Recent Professional Courses & Seminars:**
- * "Forensic Engineering" (presented to Dartmouth College / ASME)
 - * "Fundamentals of Automotive All-Wheel Drive Systems" (Society of Automotive Engineers)
 - * "Analyses of Riding Mower Child Backover Blade Contact Accidents" (presented to the NAFE)
 - * "Introduction to Finite Element Analysis" (American Society of Mechanical Engineers)
 - * "Uses and Misapplications of Standards" (presented to the National Academy of Forensic Engineers)
 - * "Job Safety Analysis" (National Safety Council)
 - * "Product Liability - from an Engineer's Perspective" (presented to Dartmouth College / ASME)
 - * "Codes, Standards and Government Regulations" (National Academy of Forensic Engineers (NAFE))
 - * "Design, Construction and Use of Mechanical Human Surrogates" (presented to the NAFE)
 - * "Integrating Safety into the Design of Agricultural Equipment" (Am. Socty. of Agricultural Engrs.)
 - * "Introduction to Off-Road Vehicle Dynamics" (American Society of Agricultural Engineers)
 - * "Human Factors Engineering" (University of Michigan)
 - * "Machine Safeguarding" (Allied Resources Corporation)
 - * "Photogrammetry in Accident Reconstruction" (Society of Automotive Engineers)
 - * "Perception, Reaction, Conspicuity" (University of Iowa)
 - * "A Human Factors Approach to Accident Investigation" (Human Fctrs. & Ergnmcs. Socty.)
 - * "Consumer Prod. Safety: Perceptions of Risk & Responsibility" (Human Fctrs. & Ergnmcs Socty.)
 - * "Product Safety Management" (National Safety Council)
 - * "Vehicle Rollover Accidents" (Society of Automotive Engineers)
 - * "Motor Vehicle Accident Reconstruction" (Society of Automotive Engineers)
 - * "The Dsgn. & Development of Product Warning Systms" (Rice Univ./Human Fctrs. & Ergnmcs. Socty.)
 - * "Warnings" (Rice University / Human Factors and Ergonomics Society)
- Recent Publications Authored:**
- * Book Chapter: Reed, E. S. "Ergonomics and Machine Safety", in *Machine Designers Reference*, J. Marrs (Ed.), (pp 35-92) Industrial Press, Inc. (ISBN-10: 0831134321) (2011),
 - * Article: Reed, E. S. "Forensic Engineering Analysis of Riding Lawnmower Child Backover Blade Contact Accidents", *Journal of the National Academy of Forensic Engineers*, Vol. XXIV, No.1: 101-119 (2007),
 - * Article: Reed, E. S. "Design, Construction and Use of Economical Mechanical Human Surrogates", *Journal of the National Academy of Forensic Engineers*, Vol. XVIII, No.2: 59-76 (2001).

EXHIBIT B

E. Smith Reed, P.E., PLLC

April 30, 2020

The following is a list of all cases in which I have testified at trial or in deposition in the past 10 years:

<u>Janowski v Deere</u> (as a fact witness) deposition testimony of 7/27/17 Circuit Court of Genesee County, Michigan	Chelsea, VT 14-103771-NI
<u>Fraser v Boething Nursery</u> deposition testimony of 6/24/15 Superior Court, California, L.A.-Central-Civil-West	Richmond, VA JCCP4674
<u>McCoy v Snapper</u> deposition testimony of 7/11/13 State Court of Fulton County, Georgia	Atlanta, GA 12-EV-014653J
<u>Marks v Briggs & Stratton</u> deposition testimony of 6/12/12 State Court of Fulton County, Georgia	Atlanta, GA 2009-EV20078138B
<u>Moore v Jupiter Lanes</u> deposition testimony of 5/15/12 Crct. Ct., 15th Jud. Dist., Palm Beach Co., FL	Hanover, NH 502010CA018769XXXXMB
<u>Vitale v RD Olson and CEC</u> deposition testimony of 6/1/11 Superior Ct., State of Rhode Island, Providence,	Manchester, NH SS PC 06-1407
<u>Nationwide v JD Eq., et al</u> deposition testimony of 4/15/11 Court of Common Pleas, Fayette Co., Ohio	Hanover, NH 09 CHV 00354
<u>Lichtman v Blanchard Eq.</u> deposition testimony of 4/6/11 State Court of Bulloch County, Georgia	Savannah, GA 2B IOCV397
<u>Mitchell v Textron</u> trial testimony of 9/22/10 Worcester Superior Ct., Commonwealth of Massachusetts	Worcester, MA 2005-113A
<u>Peabody v ABF</u> deposition testimony of 8/23/10 State of Maine Superior Court, Washington,	Portland, ME SS. CV-09-51
<u>Mavity v MTD</u> deposition testimony of 5/27/10 U.S. District Court, Western District of Virginia	Boston, MA 1:09cv27
<u>Follett v Sears</u> deposition testimony of 3/4/10 Circuit Court of Cook County, Illinois	Manchester, NH 06 L 4703

EXHIBIT C

LAWN MOWER ELECTRICAL INTERLOCK CIRCUITBACKGROUND:

IT HAS BEEN CITED IN MANY STUDIES THAT MANY ACCIDENTS RESULTING IN PERSONAL INJURY ARE THE RESULT OF SOMEONE MISTAKINGLY OR CARELESSLY INSERTING SOME PART OF THEIR BODY (FINGERS, HANDS, TOES, FEET, ETC.) INTO THE CUTTING BLADE(S) AREA OF LAWNMOWERS WHILE THE BLADES WERE MOVING. GREAT EFFORTS HAVE BEEN MADE TO WARN OPERATORS AND BYSTANDERS OF THE DANGERS ASSOCIATED WITH LAWNMOWERS AND THEIR CUTTING BLADES, AND AS MUCH PROTECTION SHIELDING AS FUNCTIONALLY POSSIBLE HAVE OFTEN BEEN USED TO PROTECT FROM SUCH ACCIDENTS.

ON MANY MOWERS, PERSONAL INJURY COULD OCCURE, ALSO, IF AN OPERATOR UNKNOWINGLY STARTED THE MOWER'S ENGINE WHILE THE MOWER WAS IN "GEAR" CAUSING THE MOWER TO START MOVING UNEXPECTEDLY INTO A BYSTANDER. WARNINGS HAVE BEEN PUBLISHED FOR THE OPERATOR TO START MOWER ONLY WHEN THE TRANSMISSION IS IN "NEUTRAL" TO PREVENT SUCH ACCIDENTS.

ANOTHER POTENTIAL SOURCE OF PERSONAL INJURY OR PROPERTY DAMAGE IS THE SITUATION WHERE THE OPERATOR HAS LEFT THE OPERATOR'S POSITION (PERHAPS THE OPERATOR SEAT) AND THE MOWER IS ACCIDENTALLY KNOCKED INTO "GEAR" WHILE THE ENGINE IS RUNNING, CAUSING THE MOWER TO PROCEED MOVING AHEAD WITHOUT AN OPERATOR TO CONTROL WHERE IT IS GOING. THE SAME TYPE OF INJURY COULD OCCURE, ALSO, IF WHILE THE OPERATOR ~~WAS~~ MOVING AHEAD ON THE MOWER, ~~WHILE~~ MOWING OR SIMPLY TRANSPORTING, FOR SOME

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Ed Smith Reeder - April 4, '76

on the date(s) above

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on

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REASON OR ANOTHER THE OPERATOR FELL OR JUMPED OR LEFT THE OPERATOR POSITION WITHOUT TAKING THE MOWER OUT OF "GEAR" OR STOPPING THE BLADE(S), AND THE MOWER PROCEEDED MOVING AHEAD UNATTENDED. OPERATORS HAVE ALWAYS BEEN WARNED TO BE CAREFUL AROUND MOWING EQUIPMENT, BUT WARNINGS DO NOT PREVENT OCCASIONAL OPERATORS FROM BECOMING SUDDENLY VIOLENTLY ILL WHILE MOWING.

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FOR MAINTENANCE AND CONVENIENCE OF CHECKING OUT THE MACHINE, IT IS DESIRABLE TO ALLOW THE MOWER TO BE STARTED WHEN ALL CONTROLS ARE IN "NEUTRAL" POSITION BUT WITHOUT HAVING TO SIT ON THE OPERATOR'S POSITION (IN THE SEAT). ALSO, FOR CONVENIENCE, IT IS DESIRABLE TO ALLOW THE MACHINE TO BE RUN WHEN ALL CONTROLS ARE IN "NEUTRAL" EVEN WITH NO OPERATOR IN THE OPERATOR'S POSITION (SEAT).

INVENTION
DISCUSSION:

THE DEVICE DESCRIBED HERE, (ELECTRICAL CIRCUIT DESCRIBED), WILL LIMIT A PIECE OF INDUSTRIAL EQUIPMENT, INCLUDING LAWNMOWERS, TO OPERATING AS SAFELY AS ABOVE DESCRIBED WHEN THE EQUIPMENT IS POWERED WITH AN ELECTRICAL STARTER FOR ITS GASOLINE ENGINE, AND THE ENGINE'S IGNITION IS DESIGNED TO SHUT OFF IF THE WIRE BETWEEN THE COIL AND THE BATTERY IS DISCONNECTED.

THE CIRCUIT CONSISTS OF A NUMBER OF COMPONENTS AND A WIRING SCHEMATIC TIEING THEM ALL TOGETHER TO GIVE THE DESIRED RESULTS. IN SHORT, THE DESIRED RESULTS, FUNCTION WISE, ARE AS FOLLOWS (ON THE NEXT PAGE):

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DESIRED RESULTS ARE:

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1. MACHINE CANNOT BE STARTED IN ANY WAY WHEN CONTROLS ARE NOT IN "NEUTRAL", OR TRANSMISSION IS IN "GEAR", REGARDLESS IF THERE IS AN OPERATOR IN THE SEAT OR NOT
2. If CONTROLS (MOWING CONTROLS) ARE IN "NEUTRAL" AND TRANSMISSION IS IN "NEUTRAL" POSITION, THE ENGINE STARTER MAY BE CAPABLE OF BEING ENERGIZED TO START THE ENGINE, REGARDLESS IF THERE IS A PERSON IN THE OPERATOR'S SEAT OR NOT, AND THE ENGINE ELECTRICALLY MAY BE CAPABLE OF RUNNING
3. ONCE THE ENGINE IS RUNNING, IT SHALL BE CAPABLE OF CONTINUING TO RUN EVEN IF THE OPERATOR SHOULD LEAVE THE OPERATOR'S SEAT SO LONG AS AND ONLY IF THE TRANSMISSION IS IN "NEUTRAL" POSITION, AND THE "MOWING" CONTROL IS IN "NEUTRAL" POSITION.
4. If THE OPERATOR LEAVES THE OPERATOR POSITION (SEAT) WHILE EITHER THE TRANSMISSION IS IN "GEAR", OR THE MOWER CONTROLS ARE "ENGAGED", OR BOTH "ENGAGED" AND IN "GEAR", ^{AND} THE ENGINE ~~IS~~ IS RUNNING, THEN UPON THE OPERATOR'S DEPARTURE, THE ENGINE SHALL CEASE TO RUN AND COME TO A STOP.
5. If THE MACHINE ~~SETS~~ ^{SETS} BOTH ITS ENGINE RUNNING WITH ITS TRANSMISSION IN "NEUTRAL" AND MOWER CONTROLS IN "NEUTRAL" AND NO OPERATOR IN THE OPERATOR'S SEAT, AND EITHER THE TRANSMISSION IS PLACED INTO "GEAR", OR THE MOWER CONTROLS ARE "ENGAGED" OR BOTH, THEN THE ENGINE SHALL CEASE TO RUN AND COME TO A STOP.
6. ONCE THE ENGINE IS RUNNING, IT SHALL BE CAPABLE

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of CONTINUING TO RUN SO LONG AS THE OPERATOR IS IN THE OPERATOR POSITION (IN THE SEAT) REGARDLESS OF WHAT POSITION THE TRANSMISSION IS IN (IN OR OUT OF "GEAR") AND REGARDLESS OF WHAT POSITION THE MOWER CONTROLS ARE IN ("ENGAGED" OR "NEUTRAL").

THE COMPONENTS PRESENT IN THE INTERLOCK CIRCUIT SYSTEM ARE AS FOLLOWS:

1. ENGINE: ELECTRIC STARTER TYPE. TO SHUT ENGINE off, WIRE BETWEEN ENGINE COIL AND BATTERY CAN BE DISCONNECTED.
2. BATTERY: TO PROVIDE CURRENT TO THE ELECTRIC STARTER ON ENGINE AND CURRENT TO ENGINE'S COIL
3. RECTIFIER: TO REGULATE THE AMOUNT OF CURRENT SUPPLIED TO THE BATTERY FOR CHARGING
4. KEY SWITCH - MULTIPLE POSITION: AT THE DISCRETION OF THE OPERATOR, TO DIRECT THE ENGINE TO EITHER "START", OR "RUN", OR "TURN OFF - STOP".
5. SEAT SWITCH: TO DETECT IF SOMEONE IS IN THE OPERATOR'S SEAT (CIRCUIT "CLOSED" IF THERE IS AN OPERATOR, "OPEN" IF NOT).
6. MOW SWITCH: TO DETECT IF MOWER(S) IS (ARE) "ENGAGED" OR IN "NEUTRAL" (CIRCUIT "OPEN" IF "ENGAGED", "CLOSED" IF IN "NEUTRAL").
7. TRACTION SWITCH: TO DETECT IF MACHINE IS IN "GEAR" OR NOT (CIRCUIT "OPEN" IF IN "GEAR", "CLOSED" IF IN "NEUTRAL").
- (OPTIONAL) 8. HOURMETER: TO REGISTER TIME OPERATED ON MACHINE
- (OPTIONAL) 9. AMMETER: TO INDICATE RELATIVE CHARGE OR DISCHARGE TO THE BATTERY.
- (OPTIONAL) 10. FUSE: TO PROTECT ELECTRICAL CIRCUIT AGAINST ^{SHORTS} ETC.

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(OPTIONAL) II. STARTER RELAY SOLENOIDS TO LESSEN ELECTRICAL FATIGUE DUE TO HIGH CURRENTS ON THE "KEY SWITCH".

IN ORDER TO MAKE THIS SYSTEM WORK, A KEY SWITCH HAS BEEN DEVELOPED TO GIVE A SPECIFIC CIRCUITRY. THE KEY SWITCH MUST HAVE AT LEAST THREE POSITIONS ~~AND~~ OF OPERATION, AND SIX TERMINALS FOR ELECTRICAL CONNECTION. PREVIOUS STATE OF THE ART KEY SWITCHES HAVE NOT HAD SUCH A CIRCUIT AS IS DESCRIBED HERE BELOW.

KEY SWITCH CIRCUIT:

KEY POSITION	<u>B, I, A, + S</u> CIRCUIT	<u>X + Y</u> CIRCUIT
off	OPEN	OPEN
RUN	B + I + A	X + Y
START	B + I + S	OPEN

NOTE: B + I + A MEANS TERMINALS B AND I AND A ARE ALL CONNECTED TOGETHER.

B + I + S MEANS TERMINALS B AND I AND S ARE ALL CONNECTED TOGETHER.

X + Y MEANS TERMINALS X AND Y ARE CONNECTED TOGETHER.

OPEN MEANS NONE OF THE RESPECTIVE TERMINALS ARE CONNECTED TOGETHER.

WITHOUT THIS PARTICULAR KEY SWITCH CIRCUITRY, THE CIRCUIT FURTHER DESCRIBED WOULD HAVE TO REQUIRE THREE ADDITIONAL SWITCHES. THE IDEA DESCRIBED HERE, HOWEVER, ~~NEEDS NO~~ ~~NEEDS NO~~ ~~NEEDS NO~~ SUCH DISCUSSION.

KEEPING THIS KEY SWITCH CIRCUITRY IN MIND, THE INTERLOCK CIRCUIT IN ITS COMPLETE STAGE IS AS FOLLOWS ON THE NEXT PAGE:

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has been described by

E. Smith Reed Jr. April 4, '76

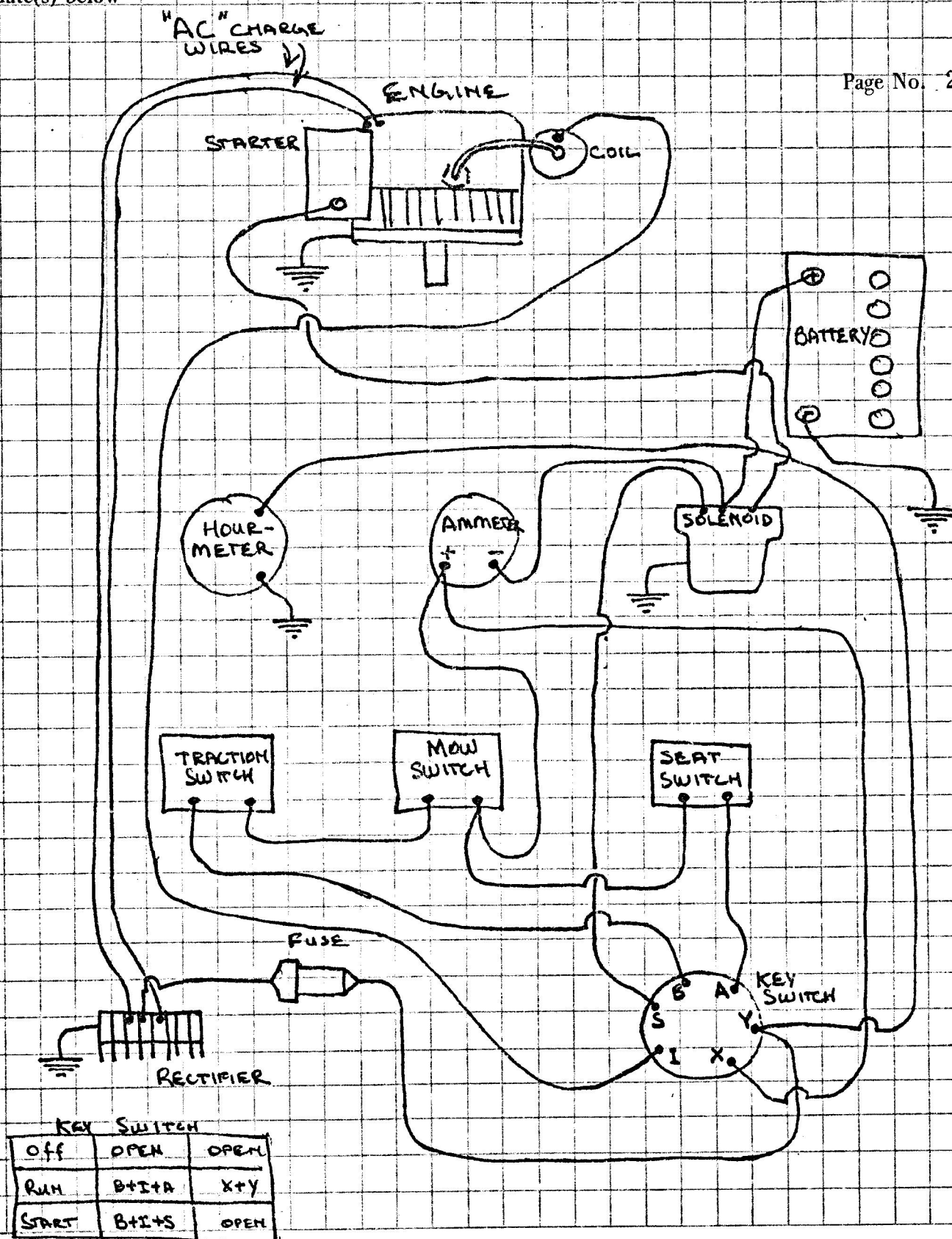
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THE FIRST MACHINE WITH THIS CIRCUIT WAS BUILT AND TESTED IN SEPT., OCTOBER, 1975 WITH TOTAL SUCCESS. SINCE THAT TIME, IN NOVEMBER AND DECEMBER, TWO MORE MACHINES WERE BUILT WITH THIS CIRCUIT, AGAIN WITH TOTAL SUCCESS. AGAIN, IN LATE MARCH, TWO MORE MACHINES WERE BUILT AND TESTED, AGAIN SUCCESSFULLY.

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THIS INVENTION GIVES THE ADVANTAGE OF PROVIDING A SAFER MOWER LESS LIKELY TO BE INVOLVED IN ACCIDENTS CAUSING PERSONAL INJURY OR PROPERTY DAMAGE. ALSO, WITH THE SPECIAL SWITCH, IF THE CIRCUIT IS NOT SATISFIED WITH CONTROLS IN "NEUTRAL", NOT ONLY WILL THE ENGINE NOT RUN, BUT IT WILL FAIL TO EVEN TURN OVER, THUS TELLING OPERATOR EVERYTHING IS NOT RIGHT RATHER THAN TURNING OVER BUT FAILING TO START (LEAVING THE OPERATOR WITH QUESTIONS OF IF THE SYSTEM IS SATISFIED, OR IF THE ENGINE SIMPLY IS DIFFICULT TO START).

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