

[54] **FOLDING HANDLE AND LATCH ASSEMBLY**

[75] Inventors: **Richard A. Thorud**, Bloomington; **Henry B. Tillotson, III**; **William D. Wood**, both of Minneapolis, all of Minn.

[73] Assignee: **The Toro Company**, Minneapolis, Minn.

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[51] Int. Cl. .... **B62b 3/02**

[58] Field of Search..... **16/110, 111 R, 111 A, 112, 16/125, 126; 24/201 SL, 201 S; 248/354 P; 280/47.37; 403/13, 14, 94, 101, 102, 324, 325, 328**

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*Primary Examiner*—Bobby R. Gay

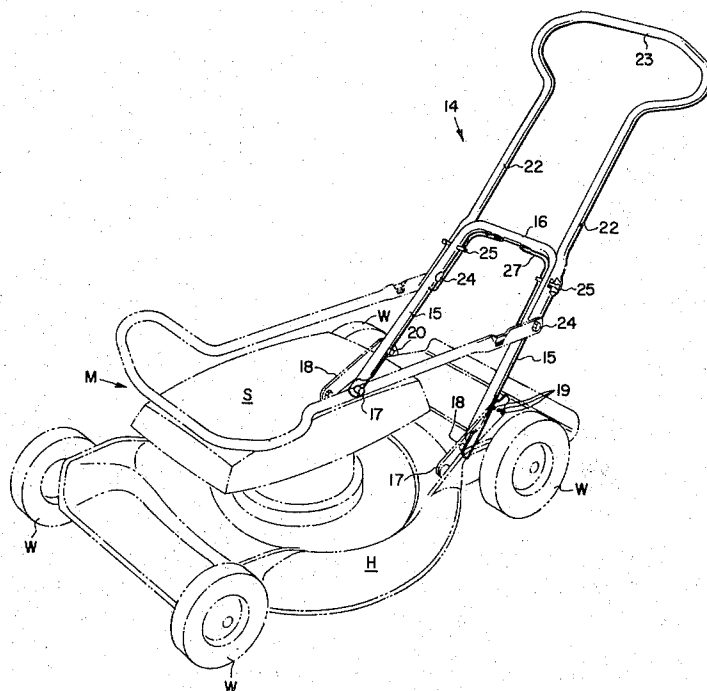
*Assistant Examiner*—William E. Lyddane

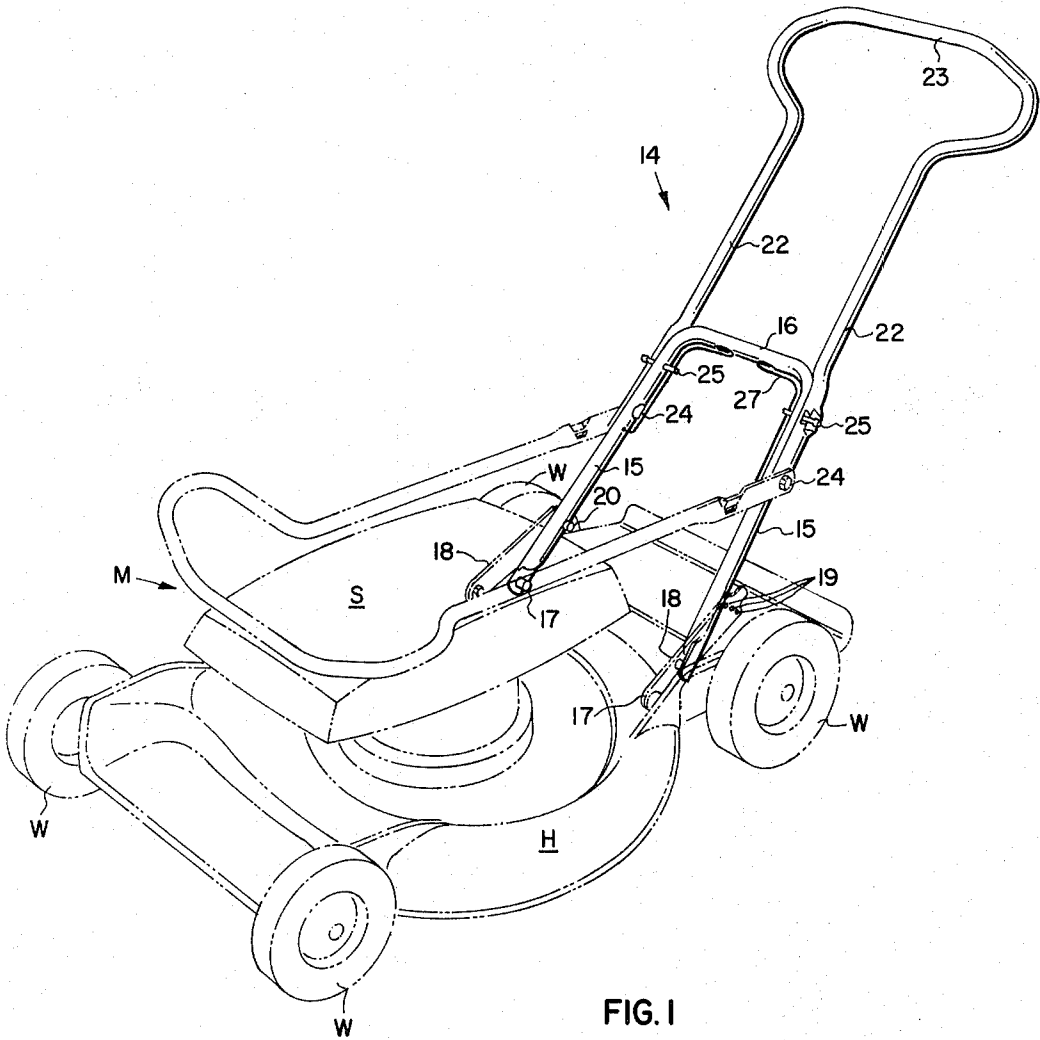
*Attorney, Agent, or Firm*—James E. Olds; Vernon A. Johnson

[57] **ABSTRACT**

A folding handle for a rotary mower. The handle is composed of two similar inverted U-shaped sections, an upper and lower, with the lower section being attached to the mower housing, and with the upper section overlapping the lower section for a portion of its length, and being pivotally connected to the lower section. A unique latch mechanism locks both sides of the upper and lower handle sections together rigidly in the upright operative position, and is easily released by one hand of the operator to allow the upper section to be folded forward to a generally horizontal position over the engine. The latching mechanism includes two sliding pins biased outwardly by two spring-wire handles. The upper handle section includes ramps to engage and push inwardly the pins as the upper handle section is being swung into the rigid operative position. Aligned holes in the upper handle section engage the pins to secure the upper handle section to the lower handle section.

**2 Claims, 7 Drawing Figures**





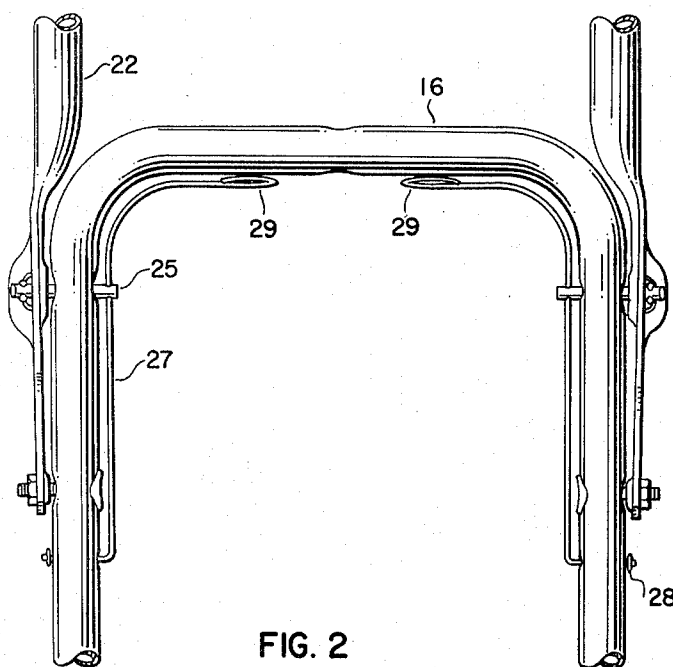


FIG. 2

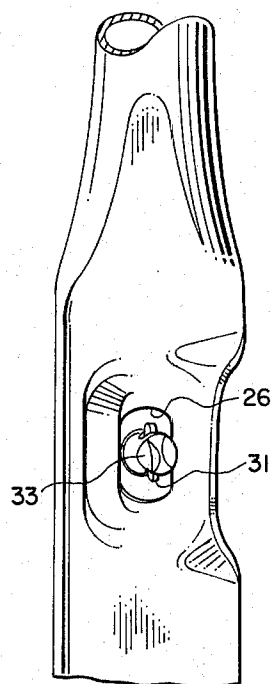


FIG. 3

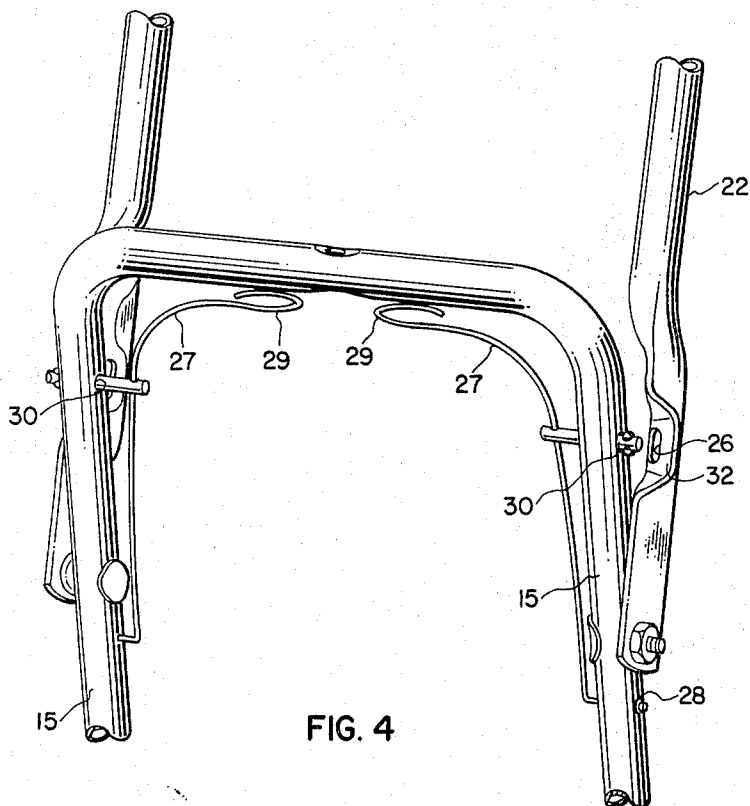


FIG. 4

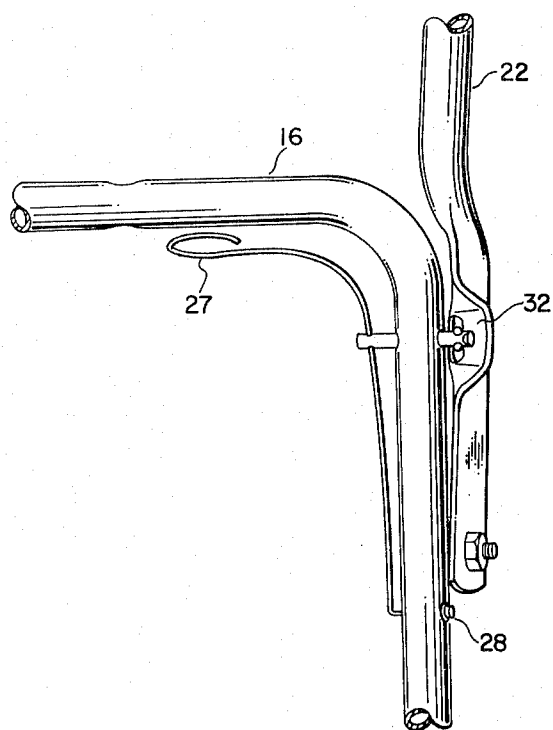


FIG. 5

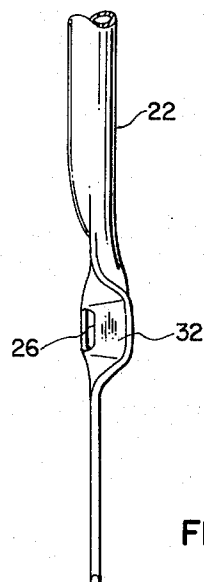


FIG. 6

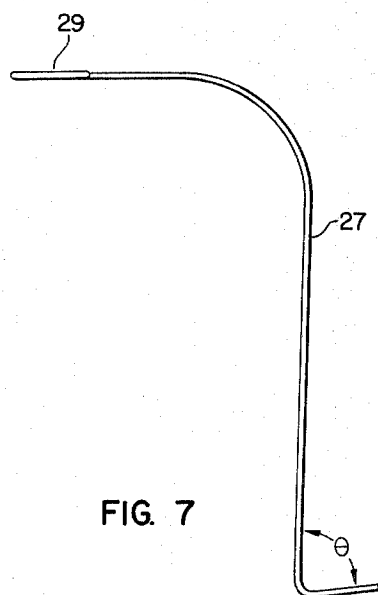


FIG. 7

# FOLDING HANDLE AND LATCH ASSEMBLY

## BACKGROUND AND SUMMARY OF THE INVENTION

This invention concerns a folding handle and latch mechanism for a hand-push or self-propelled apparatus, and in particular a rotary mower.

In any seasonal type of equipment that is normally used or stored around the home, it is extremely desirable that the equipment have the capability of being stored in a minimum of space. In the average home or garage, storage space is at a premium, with increased use of lawn and garden maintenance equipment, recreational vehicles, etc., all requiring storage space when not in use. In regard to the particular seasonal unit being discussed in this application, namely a rotary mower, ease of transporting is another important consideration. Many times the owner must move the mower in his family car, perhaps to a lake cottage, a cemetery, elderly parents' home, etc. Therefore, another advantage of this invention is to make the mower easily reducible in size so it will fit into a station wagon, or into the trunk of a car and allow the trunk lid to be closed. An equally important aspect of this invention is to provide that the handle can be quickly and easily restored to the operative position.

Since rotary mowers are often operated by persons who are not necessarily mechanically inclined, it is another advantage of this invention to make it as simple as possible to manipulate, both when folding the handle to the non-operative position, and when restoring the handle to the rigid operative position. No tools are required, and there are no knobs, wing nuts, cotter pins, or other fasteners to loosen or remove, and which are then subject to loss. To fold the upper section of the handle forward, a squeezing action between the thumb and finger of one hand of the operator, pulls together the two spring-wire handles which in turn move two latch pins out of the latched position. The operator may then rotate the upper section of the handle forward with the other hand. Any flexible control cables or wires which may be attached to the upper section will fold in a gentle bend and will suffer no damage. To return the upper section of the handle to the operative position, it merely requires swinging the upper section of the handle to the original position. During this swinging movement, a ramped area, integral in the upper handle section, guides the latch pins inwardly against the spring tension of the spring-wire handles. When the pins are aligned with the elongated holes in the upper section, spring tension will snap the pins outwardly into the holes, thus locking the upper section to the lower section. No manipulation of the latch mechanism is required to engage the handle sections in the latched position. An integral stop in the upper handle section prevents the upper section from rotating over-center, or past the operative position in the wrong direction.

Another advantage of the invention is to provide for ease and economy in the manufacture of the component parts. The upper section of the handle is made of one continuous piece of tubing, shaped at the closed end for a hand grip area, and shaped, formed, and punched at the ends of the legs for the latch pins and pivot bolts. Since there are no weldments or projections, a vinyl tube or other non-slip material can be slipped onto the upper handle section to be located on the hand grip area. The lower section of the handle is

also formed of one piece of continuous tubing, shaped, formed and punched. The lower end of the legs are flattened for greater support in the area where the legs are pivotally attached to the brackets on the mower housing. The latch pins and spring-wire handles are made with standard materials and processes.

Still a further advantage of this invention is to provide a latch mechanism in which the components are mutually interconnected so there is virtually no possibility of malfunction of the folding mechanism due to loss of any of the components. The only components that are not captivated are the lock units on the pivot bolts. In the rare event that one of the lock nuts should work loose and fall off, the spring-wire handle will hold the pivot bolt in position.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

Other advantages of this invention will become apparent after a study of the accompanying drawings and descriptions, wherein:

FIG. 1 is an isometric front view of a rotary mower, typical except for the folding handle and latch mechanism of this invention, with the handle in the normal operative position;

FIG. 2 is a front view of the latch mechanism with the upper and lower handle sections locked together in the operative position;

FIG. 3 is an enlarged side view of the latch pin;

FIG. 4 is a rear view of the latch mechanism in the unlatched position;

FIG. 5 is an enlarged view of the latch pin just as the ramp area on the upper handle contacts the latch pin prior to engaging the handle sections;

FIG. 6 is an enlarged rear view of a portion of the upper handle, similar to FIG. 5, with portions of the latch mechanism removed for clarity; and

FIG. 7 is a front view of one spring-wire shown in an unbiased orientation.

Referring to the preferred embodiment in detail, FIG. 1 shows a conventional rotary mower M, typical except for the folding handle and latch described in this application. The mower includes a housing H, four wheels W, two of which may be powered, an engine E, a shroud S over the engine, and a handle assembly 14. A horizontally rotating blade is enclosed within the housing H, and is not shown.

The handle assembly consists of a lower section and an upper section. The lower section is a continuous piece of tubing, bent to provide two parallel lower legs 15 and a connecting lower cross portion 16. The lower ends of legs 15 are flattened and pivotally connected to the housing H by two horizontal pins 17. A short brace 18 is pivotally attached to each side of the housing by means of shoulder bolts slightly forward of pins 17. These braces 18 have a series of holes 19 at the upper end, one of which is selectively fitted over a swaged pin 20 protruding outwardly from each of the lower legs 15. Each brace 18 provides a diagonal support to hold the lower handle section in the operative positions. The operator selects the hole which will provide the proper handle angle and height for his stature.

The upper section of the handle is similar to the lower section, but the upper legs 22 are slightly longer, and the upper cross portion 23 is wider and is shaped for a convenient hand grip. The lower ends of legs 22 are flattened and formed to overlap slightly the upper

portion of legs 15 and are pivotally attached to legs 15 by means of pivot bolts 24.

The upper legs 22 are held in alignment with the lower legs 15 by means of latch pins 25 which protrude through the lower legs 15 and through aligned holes 26 (See FIGS. 2, 4 and 6) in the overlapping portion of upper legs 22. A spring-wire handle 27 passes through the inner end of each of the latch pins 25. The spring-wire handles 27 have a transverse bend at the lower end, this portion passing outwardly through the lower legs, and are secured by retaining clips 28. The bend is slightly less than 90°,  $\theta$  being approximately 80°, in relation to the straight portion of the spring-wire handle 27, thus imposing spring tension to each spring-wire handle 27 toward the inner portion of each leg 15 of the lower handle section, and thus tensioning the latch pins 25 outwardly in the engaging direction. The straight portion of the spring-wire handle 27 passes over the heads of the pivot bolts 24 and thus prevents the bolts from dropping out of the lower handle sections even if the lock nuts should somehow come off pivot bolts 24. The upper ends of the spring-wire handles 27 are bent inwardly and generally follow the curve of the upper bend of the lower handle section. The inner end of each of the spring-wire handles is formed into a loop 29 into which the operator can insert a thumb and forefinger to manipulate the latch. The loop end of the spring-wire handles 27 press upwardly against the bottom surface of the cross portion of the lower handle section, thus imposing additional outward spring tension on the latch pins 25. The tension of the spring-wire handles 27 holds the latch pins 25 in the latched position when the spring-wire handles are in the normal at-rest position.

In order to disengage the latch pins 25, to allow the upper handle section to be folded forward, the operator merely inserts his thumb and finger of one hand into the loop ends 29 of the spring-wire handles 27 and squeezes the loop ends toward each other. This action slides the latch pins 25 inwardly and out of the holes 26 in the upper handle section of upper legs 22. The upper handle section is then free and can be swung forward pivoting on pivot bolts 24.

It will be noted in FIG. 1, by the phantom lines of the upper handle, that the overall length and height of the unit is materially reduced with the upper handle folded forward.

The apertures 30 (see FIG. 4) in the lower handle section for the sliding latch pins 25 are fairly close fitting over the pins to provide support and to prevent the pins 25 from canting and cocking, and thus to allow free movement on the pins as are moved in or out. The aligned holes 26 in the upper handle legs 22 are elongated in the plane of the legs for ease of disengagement and engagement of the latch pins 25.

To prevent the possibility of the latch pins 25 being pulled inwardly all the way through and out of the apertures 30 in the legs 15 of the lower handle section, the outer end of each latch pin 25 is upset (clinched) to form two small tabs 31 in the plane of the legs as shown in FIG. 3. These tabs will pass easily through the elongated holes 26 in the upper legs 22, but will not pass through the smaller close-fitting apertures 30 in the lower handle section. As the spring-wire handle loops 29 are squeezed together, the latch pins 25 move inwardly, and the tabs 31 move freely through the upper legs 22 and then come to rest against the outside of the

lower handle section. The pins are thus prevented from pulling completely out of the lower section of the handle. The spring-wire handle through the pins 25 maintain the tabs 31 in alignment with the elongated axis of the holes 26.

As the upper handle is being returned to the operative position, the ramp or ramp-shaded area 32 (see FIGS. 4, 5, 6) of the upper legs 22 contacts the outer end of each latch pin 25, and forces the pins inwardly against the tension of the spring-wire handles. The outer end of each pin 25 includes a bevelled area 33 (See FIG. 3) in the plane of the legs 15 to assist in the movement of the pins 25 along the ramp 32. As the upper handle moves into alignment with the lower handle, the pins 25 engage the ramps 32 and as the pins 25 slide along the ramps 32, the pins 25 are pushed inwardly against the spring tension of the spring-wire handles 27. The elongated holes 26 come into alignment with the latch pins 25 and the spring tension of the spring-wire handles snaps the latch pins outwardly into the elongated holes in the upper legs, thus automatically locking the upper handle into the operative position. Thus, no manipulation of the latch mechanism or of the lower handle is required to secure the upper handle into the operative position.

It is understood that even though this application describes a folding handle and latch mechanism for a lawn mower, such a combination may also be applied to any similar apparatus, in which transportation and storage are significant considerations.

It is further understood that while the shape, material, size, etc., of the component parts of the invention may be altered or modified for particular applications, the scope of the invention should be determined by the appended claims.

What is claimed is:

1. A folding handle and latching mechanism for a lawn mower, comprising in combination:

- a. a lower handle section having two elongated lower legs secured at the lower portion of said legs to the lawn mower and a cross portion located near the upper portion of said legs extending between said lower legs;
- b. two spring-wire handles each secured to one of said legs and extending along said legs toward said cross portion, said spring-wire handles also extending along said cross portion toward each other, said spring-wire handles terminating adjacent each other along said cross portion with each spring-wire handle including a hand engageable loop to permit a person to engage each loop on each spring-wire handle and bias said spring-wire handles toward each other;
- c. two latch pins each extending outwardly through each lower leg, each of said pins secured to one each of said spring-wire handles; and
- d. an upper handle section having two elongated upper legs each pivotally secured to one each of said lower legs, each said upper legs including a hole in alignment with and to receive said latch pin to rigidly secure said upper handle section to said lower handle section in the operative position of said upper handle section.

2. A folding handle and latching mechanism according to claim 1 wherein:

each of said upper legs includes a ramp adjacent to said hole, said ramp to engage said latch pins for moving inwardly said latch pin as said upper handle section is swung toward the rigid operative position and when said upper handle section reaches the rigid operative position said latch pin will pass into said hole.

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