

- [54] **PLATE TYPE NAIL HOLDER FOR EDGERS, TRIMMERS, OR OTHER APPLICATIONS** 3,158,977 12/1964 Williams 56/295
 3,625,292 12/1971 Lay 172/15 X
 [76] Inventor: **Howard H. Crawford, 9801** 3,684,027 8/1972 Crawford 172/15
 Carnegie, El Paso, Tex. 79925 3,684,028 8/1972 Crawford 172/15
 3,698,168 10/1972 Mott et al. 56/294

[22] Filed: **Apr. 10, 1974**

[21] Appl. No.: **459,904**

[52] **U.S. Cl.** 172/15; 30/303; 56/10.3;
 56/256; 83/666

[51] **Int. Cl.** A01d 35/00; B26d 1/12

[58] **Field of Search** 172/13-18;
 56/12.7, 256, 294, 295; 30/299, 303; 83/469,
 660, 663, 666, 698

[56] **References Cited**

UNITED STATES PATENTS

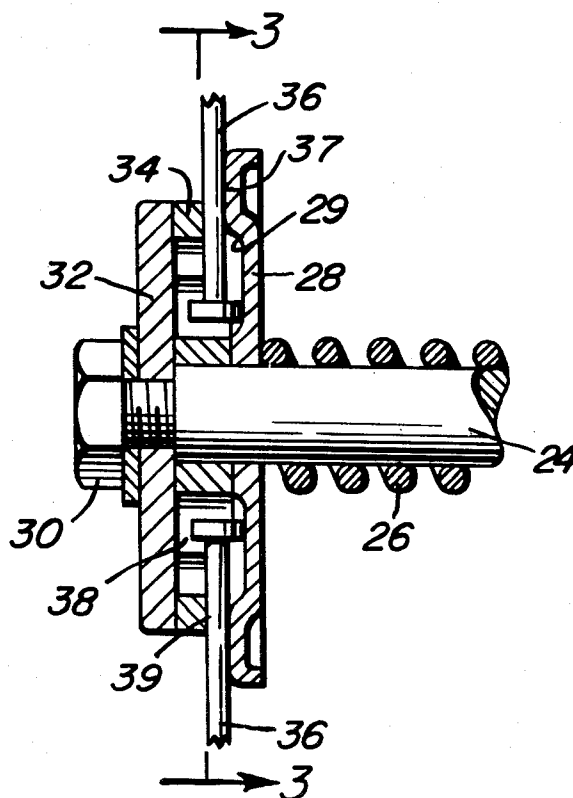
416,982	12/1889	Young	172/545
2,791,077	5/1957	Lyle	172/15 X
2,888,993	6/1959	Dunning	172/15
3,086,596	4/1963	Allegretti et al.	172/15

Primary Examiner—Edgar S. Burr
Assistant Examiner—Paul T. Sewell
Attorney, Agent, or Firm—Clarence A. O'Brien;
 Harvey B. Jacobson

[57] **ABSTRACT**

A combined nail holder and friction clutch drive means therefor, with variably adjustable pressure to accentuate, or relax, the force applied for the dual purpose of holding the nail cutter means in the cutter portion of the device, and varying the friction clutch pressure, under both static (nail replacement) and dynamic (e.g., driven and obstacle-hitting) conditions, for use in various cutting environments.

7 Claims, 5 Drawing Figures



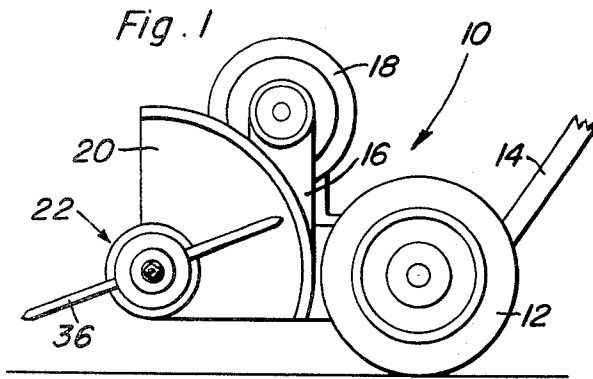
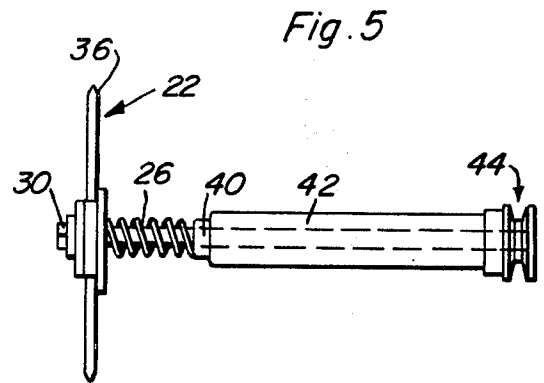
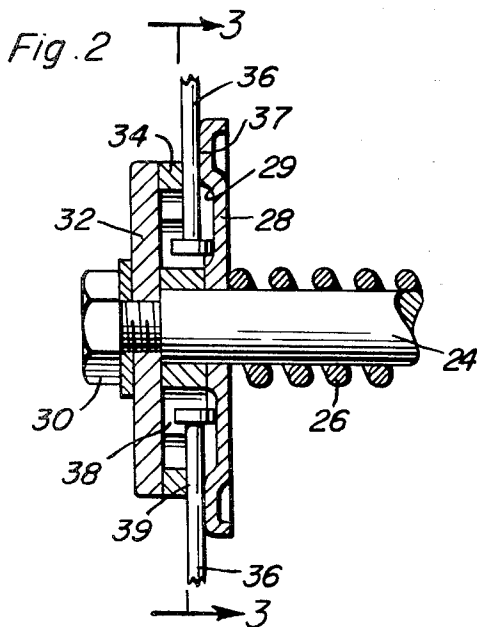


Fig. 3

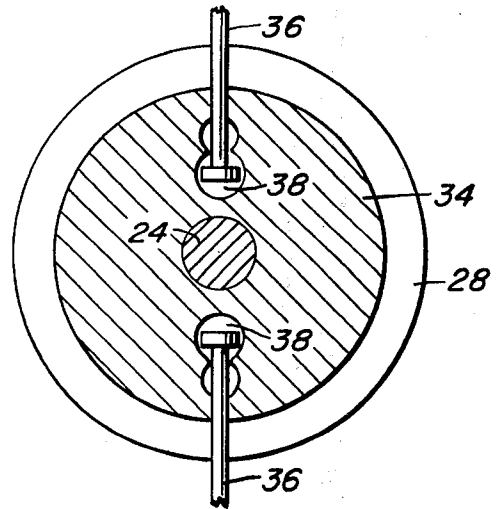
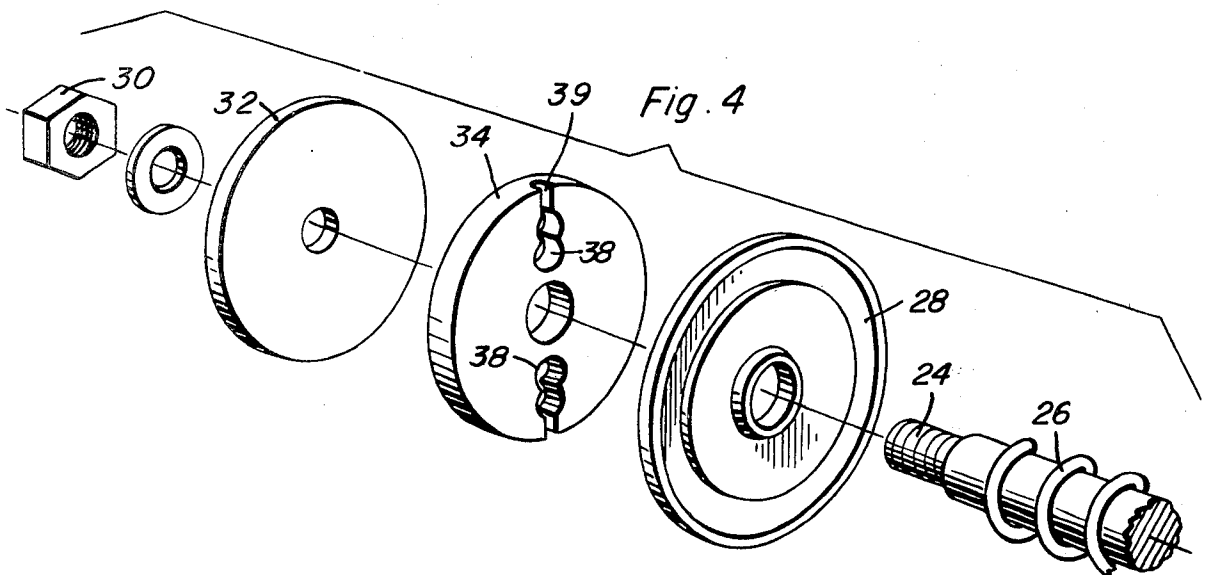


PLATE TYPE NAIL HOLDER FOR EDGERS, TRIMMERS, OR OTHER APPLICATIONS

RELATED APPLICATIONS

This application discloses a simplified, more durable, and more easily assembled and repaired improvement over my prior patents Nos. 3,684,027, and 3,684,028, issued Aug. 15, 1972.

FIELD OF INVENTION AND SUMMARY OF THE PRIOR ART

Various cutting, edging and trimming devices in the prior art are evidenced, generally, by the patents of record in my two prior patents. In particular, note is made of various replaceable features for the cutting means, as in FIGS. 3 and 4 of Young (No. 416,982, issued Dec. 10, 1889), FIGS. 4 and 5 of Lyle (No. 2,791,077, issued May 7, 1957), FIGS. 3 through 5 of Dunning (No. 2,888,993, issued June 2, 1959), and in FIGS. 3 through 6 of Diesterweg (No. 3,018,602, issued Jan. 30, 1962). Similarly, resilient and spring retaining means are shown, as at 13 in each of Kesteren (No. 1,970,827, issued Aug. 21, 1934), Dunning (cited supra), and at 45 in Diesterweg (cited supra). As is evident from the above, the variations are quite numerous.

SUMMARY OF THE INVENTION

Among the objects and advantages of this invention are the following:

To provide a device which combines the functions of retaining the cutting means (e.g., nails), providing an adjustably variable friction clutch connection, to allow continued rotation when an obstacle is hit; and, which has long wear characteristics, yet a minimal number of easily replaceable parts, whenever breakage, damage, wear, or other situations which call for repair or replacement of one or more of the few parts occurs.

This combination of functions is attained by structurally relating a nail holding plate between a spring-biased pressure plate and a drive plate so that the nail holding plate will be frictionally driven by the drive plate and the pressure plate serves the dual function of releasably retaining nails mounted on the nail holding plate and maintaining frictional drive between the plates.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a somewhat schematic side view of a lawn edger equipped with a nail-type cutting means.

FIG. 2 is a predominantly cross-sectional view of a portion of the device showing the relative positions of some of the parts adjacent the nail-type cutting means.

FIG. 3 is a cross-sectional view taken approximately along the line 3—3 of FIG. 2.

FIG. 4 is an exploded, perspective partial view.

FIG. 5 is a side view of the driven cutter sub-combination.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In FIG. 1, 10 represents the lower portion of a lawn edging device, 12 denoting one, or more, rear wheels contacting the ground, 14 designating the handle for steering the overall device, 16 the visible part of the housing supporting a conventional motor 18 (electric or internal combustion). 20 is a safety shield, and 22 the driven cutter means driven by the motor 18, the driving connections being shown in the subsequent figures.

The main drive shaft for the rotating cutter means 22 is shown as 24, in FIG. 2. Surrounding the shaft is a coil spring 26, pressing against a pressure plate 28 that is movable along the shaft. At the extreme left hand portion of FIG. 2, left-hand threaded nut 30 retains a driven plate 32 on the end of shaft 24. Between the driven plate and the pressure plate is a nail retaining plate 34, showing nails 36—36 positioned in recesses therein.

Looking at plate 34 in FIG. 4, the recesses 38—38 in this plate can accommodate headed nail-type elements having variously configured and dimensional head portions; and if the head portions are "oversize" with respect to the thickness of plate 34, the nails will still be kept properly in position by the spring pressure caused by spring 26, the through nature of the recesses 38—38 being best shown in FIGS. 3 and 4. As shown, each recess 38 includes a radial groove 39 which receives the shank of a nail 36 thereby retaining the nails in radial relationship to the plate 34. Also, as illustrated in FIG. 2, the plate 28 is provided with a circumferential recess 29 in alignment with the recesses to receive a portion of the nail heads. The plate 28 also includes a flat outer peripheral portion 37 which closes the groove 39 or engages the shank of the nail 36 if the diameter is such that it projects beyond the face of plate 34.

FIG. 5 shows a set collar 40, which has a diametrically related threaded hole receiving a threaded, headless, or headed, setscrew means (not shown) for adjustably positioning the set collar 40 along the shaft 24. An outer housing member 42 surrounds and rotatably mounts the shaft 24 on the edger housing. At the extreme right-hand portion of FIG. 5, suitable means (pulley-type, shown at 44) is provided on shaft 24 for receiving power from the motor 18.

Concentrating on the exploded view of FIG. 4, it is seen that the several plates, spring, and securing means are readily assembled, as shown. Once assembled, and for illustrative purposes only, assuming that the set collar 40 is so positioned on shaft 24 that the spring exerts an average or medium pressure, nails may be replaced simply by pulling pressure plate 28 toward the set collar 40 until there is sufficient space between 34 and 28 to remove and/or insert new nails, as needed. Similarly, such an average or medium pressure setting would allow the plate 34 (with nails 36—36 therein) to "slip" between the plates 28 and 32, whenever an obstacle is hit, or an overload situation presents itself, so that no harm comes to the drive train from motor 18 through to the cutter means 22. If the average or medium setting of the set collar makes it too difficult for the owner/operator of the cutting device to remove and insert nails, then, said owner/operator simply resets 26 further to the right (as viewed in FIG. 5) so that there is less than average or medium pressure being applied

by the spring 26, until a point is reached where pressure is still applied, but it is relatively easy to replace nails. Conversely, if the setting of the set collar 40 is too "loose," for whatever reason, and stronger pressure is desired (e.g., to cut through tall and dense portions of an edge of a lawn without having the friction clutch arrangement slip excessively), then, the set collar is moved to the left (as viewed in FIG. 5) so that a stronger than average pressure is exerted by the spring means 26; and thus, much less slippage will occur; however, if an unseen obstacle is struck by the cutting means, there will still be present the safety factor allowing the driven shaft 24 to continue to rotate and the nail retaining plate 34, again, slipping between 28 and 32, even though these parts are now under a pressure that is much higher than an average or medium setting.

Further economies occur when it is realized that in addition to the combined retaining and anti-overloading features of the assembled device, there are additional safety features inherent in this arrangement. While the safety shield 20 is still retained, there is much less chance of the device breaking or throwing one of the nail means. Similarly, with the nail holder plate 34 being made of tool steel, having a central bushing of plastic or similar trouble-free bearing material (not shown), the only sliding contact is that of the plate 34 between the plates 28 and 32, and very little wear occurs in such an assemblage. Once again, the advantages of the combined retaining and friction-clutch means in the construction of the various parts, the assembly of the various parts, and in the safe and long-lasting operation of the overall device is believed to be readily apparent from the above.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

What is claimed as new is as follows:

1. A rotary cutting head for a lawn edger having a drive shaft comprising a driven plate stationarily mounted on the shaft, a pressure plate mounted on said shaft and movable axially thereon toward and away from the driven plate, means biasing the pressure plate toward the driven plate, a cutter element retaining plate journaled on said shaft and disposed between the driven plate and pressure plate, a plurality of radially extending cutter elements carried by said retaining plate, said retaining plate including mounting means for the cutter elements, each of said cutter elements having a headed inner end and a shank, said mounting means including radially extending recess means in the retaining plate for receiving the headed inner end and adjacent portion of the shank of the cutter element whereby the pressure plate will retain the cutter elements mounted on the retaining plate and bias the driven plate, retaining plate and pressure plate toward each other for frictionally driving the retaining plate and pressure plate from the driven plate and enabling slippage of the driven plate in the event the cutter elements engage an obstruction.

2. The structure as defined in claim 1 wherein said recess means in the retaining plate includes a through hole in said retaining plate spaced inwardly from the

peripheral edge thereof and a radial groove in the surface of the retaining plate facing the pressure plate and communicating with the hole and peripheral edge of the retaining plate with the headed inner end of the cutter element being disposed in the hole and the shank of the cutter element being disposed in the groove to retain the shank of the cutter element in radial relation to the rotational axis of the retaining plate.

3. The structure as defined in claim 2 wherein said pressure plate includes an annular recess in alignment with the three holes in the retaining plate for partially receiving the headed inner end of the cutter elements, said pressure plate including an annular flat surface outwardly of the annular recess for engaging the grooved surface of the retaining plate for retaining the shanks of the cutter elements in the grooves and frictionally engaging the retaining plates when the shanks are no greater in diameter than the depth of the grooves and frictionally engaging the cutter elements when the diameter of the shanks is greater than the depth of the grooves.

4. The structure as defined in claim 3 wherein said driven plate and retaining plate have contacting flat surfaces for frictionally driving the retaining plate from the driven plate, said biasing means including a coil spring mounted on said shaft with one end of the spring engaging the pressure plate in opposed relation to the driven plate, and collar means on said shaft engaging the other end of the spring and being adjustably secured longitudinally on the shaft for varying the pressure exerted on the pressure plate by the spring.

5. The structure as defined in claim 3 wherein each through hole in the retaining plate includes a pair of radially disposed communicating axially extending apertures with the radially inner aperture being larger than the radially outer aperture thereby enabling cutter elements having different sized headed inner ends to be supported from the retaining plate.

6. The structure as defined in claim 5 wherein each of said cutter elements is in the form of a nail, a tubular sleeve rotatably supporting said drive shaft, and a drive pulley on the drive shaft adjacent the end of the sleeve remote from the plates.

7. A rotary cutting head comprising a rotary shaft, a first plate mounted on said shaft, a second plate mounted on said shaft, an intermediate plate mounted on said shaft between the first and second plates, a plurality of radially extending nails each having a headed end carried by said intermediate plate, said plates being mounted on said shaft for relative movement toward and away from each other for frictional engagement, one of said plates being fixed to said shaft for driving all of the plates and the nails, said intermediate plate including radially extending recess means receiving the headed inner end and an adjacent shank portion of a nail, said recess means including a radially extending groove in one surface of the intermediate plate and an enlarged recess at the inner end of the groove receiving the headed inner end of the nail for retaining the nail in radial relation to the rotational axis of the shaft with the frictional engagement between the plates driving all of the plates and the nails and enabling the intermediate plate with the nails mounted thereon to slip in the event the nails engage an obstacle, and means adjustably urging the first and second plates towards each other for frictionally clamping the intermediate plate therebetween.

* * * * *