United States Patent

Price

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[54] ADJUSTABLE WHEEL BRACKET ASSEMBLY

[72] Inventor: **Warren H. Price**, Sheboygan, Wis.

[73] Assignee: **Gilson Bros. Co.**, Plymouth, Wis.

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[52] **U.S. Cl.**.....**280/43.17**, 29/446, 29/526, 74/524, 287/99, 287/101

[51] **Int. Cl.**.....**B62d 21/18**

[58] **Field of Search**.....280/43.17; 151/38; 248/73, 248/74; 287/101, 14, 99; 74/524; 29/446, 526

[56] **References Cited**

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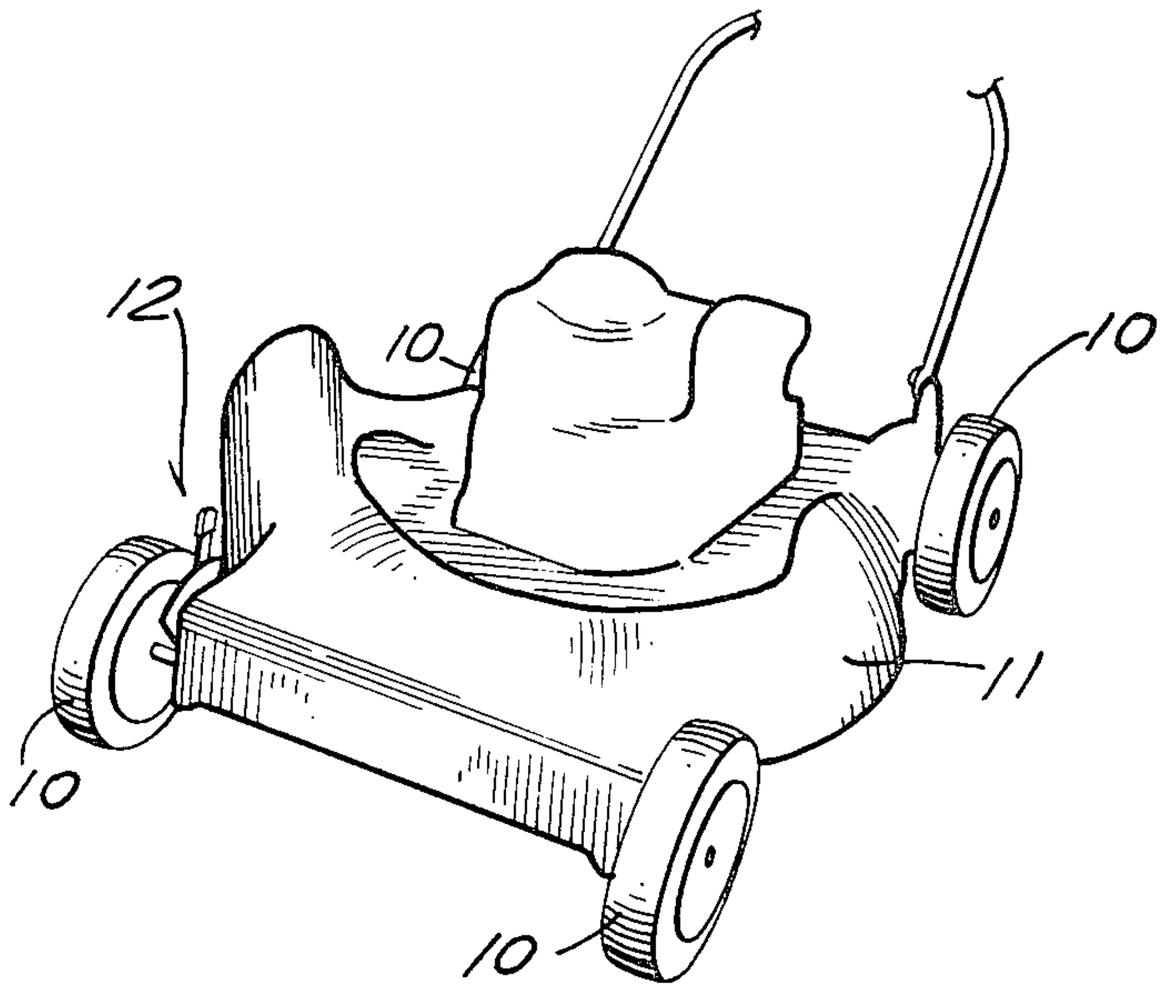
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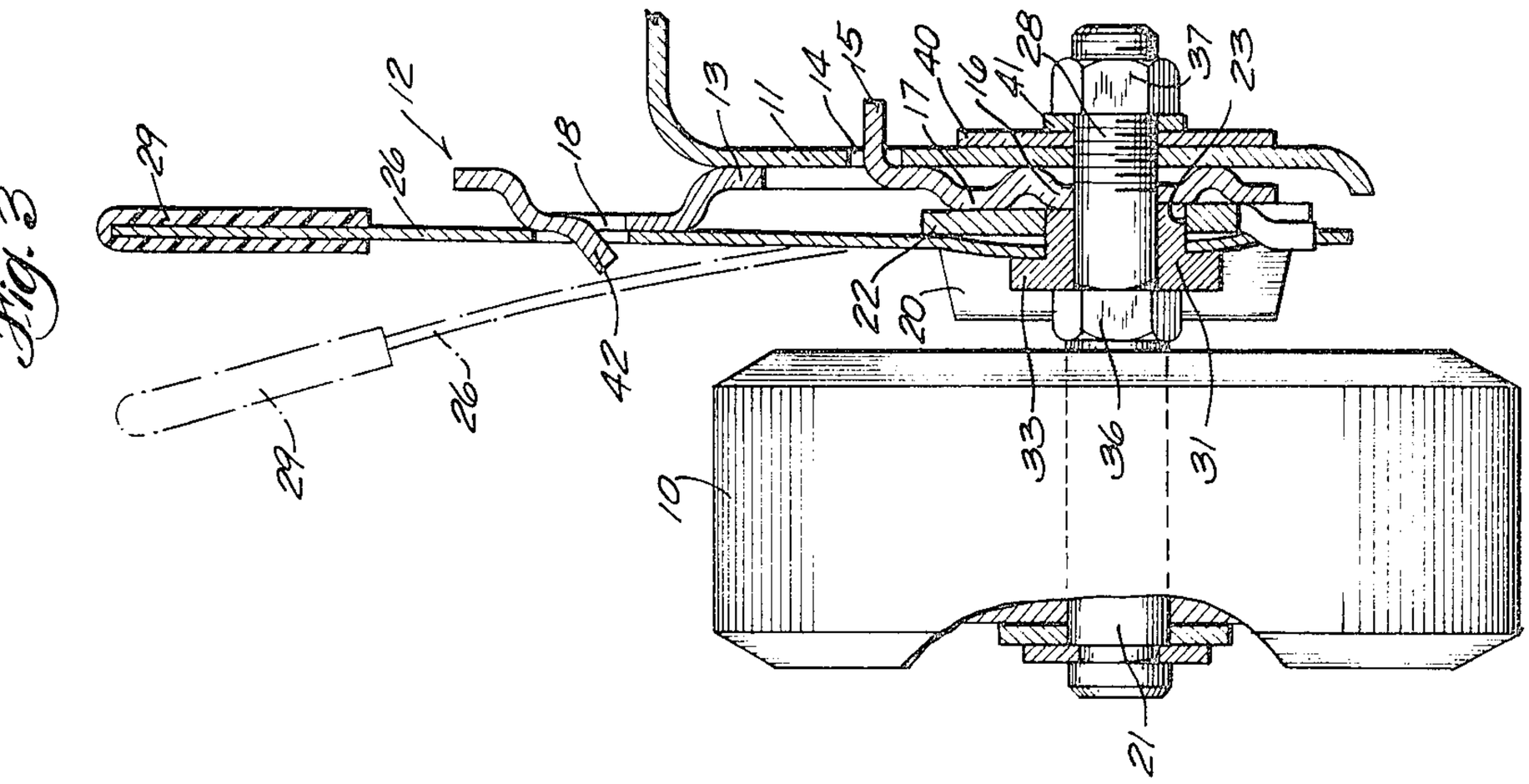
Primary Examiner—Benjamin Hersh
Assistant Examiner—Robert R. Song
Attorney—Wheeler, House & Wheeler

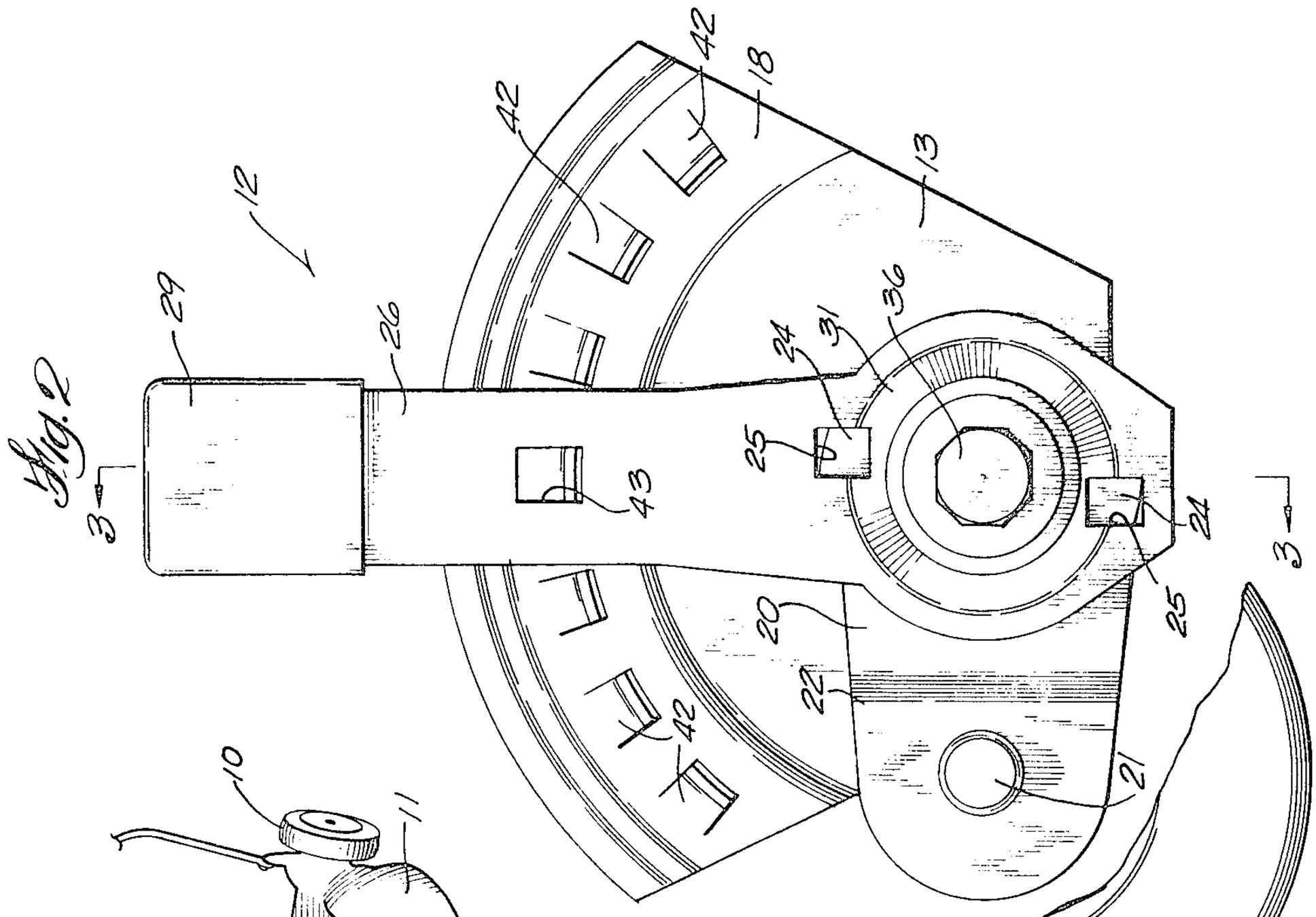
[57] **ABSTRACT**

An adjustable wheel bracket assembly which includes a relatively stiff wheel axle crank and a relatively flexible spring steel adjusting lever keyed to the crank is provided with tension producing mechanism to take up the tolerance and eliminate play in the assembly. The tension producing mechanism comprises a warp formed in the spring steel lever and a clamp to exert pressure on the warp and thus create tension in the system to hold the assembly together without play.

3 Claims, 6 Drawing Figures







Inventor
Warren H. Price

By
Wheeler, Wheeler, House & Clemency
Attorneys

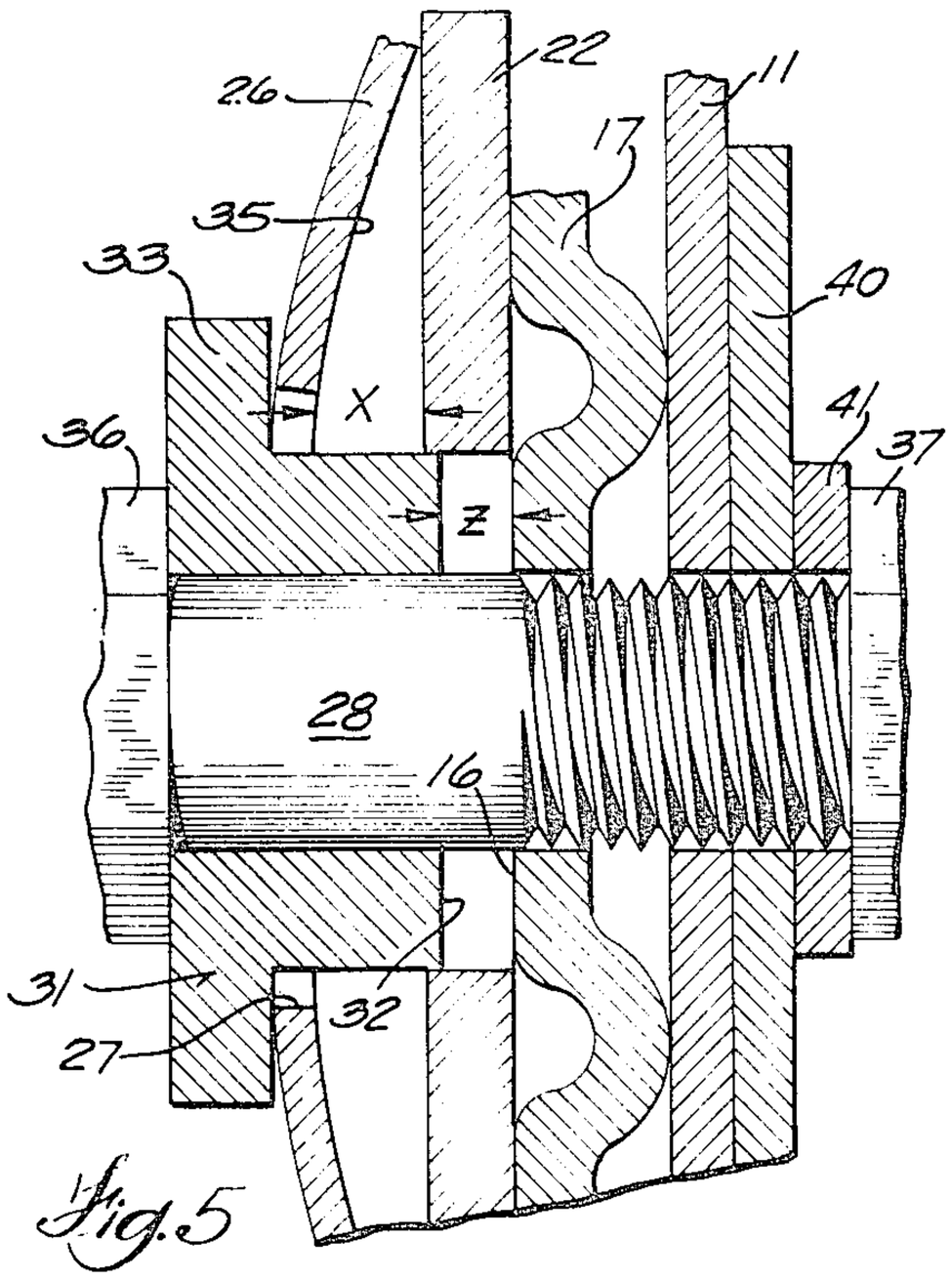


Fig. 5

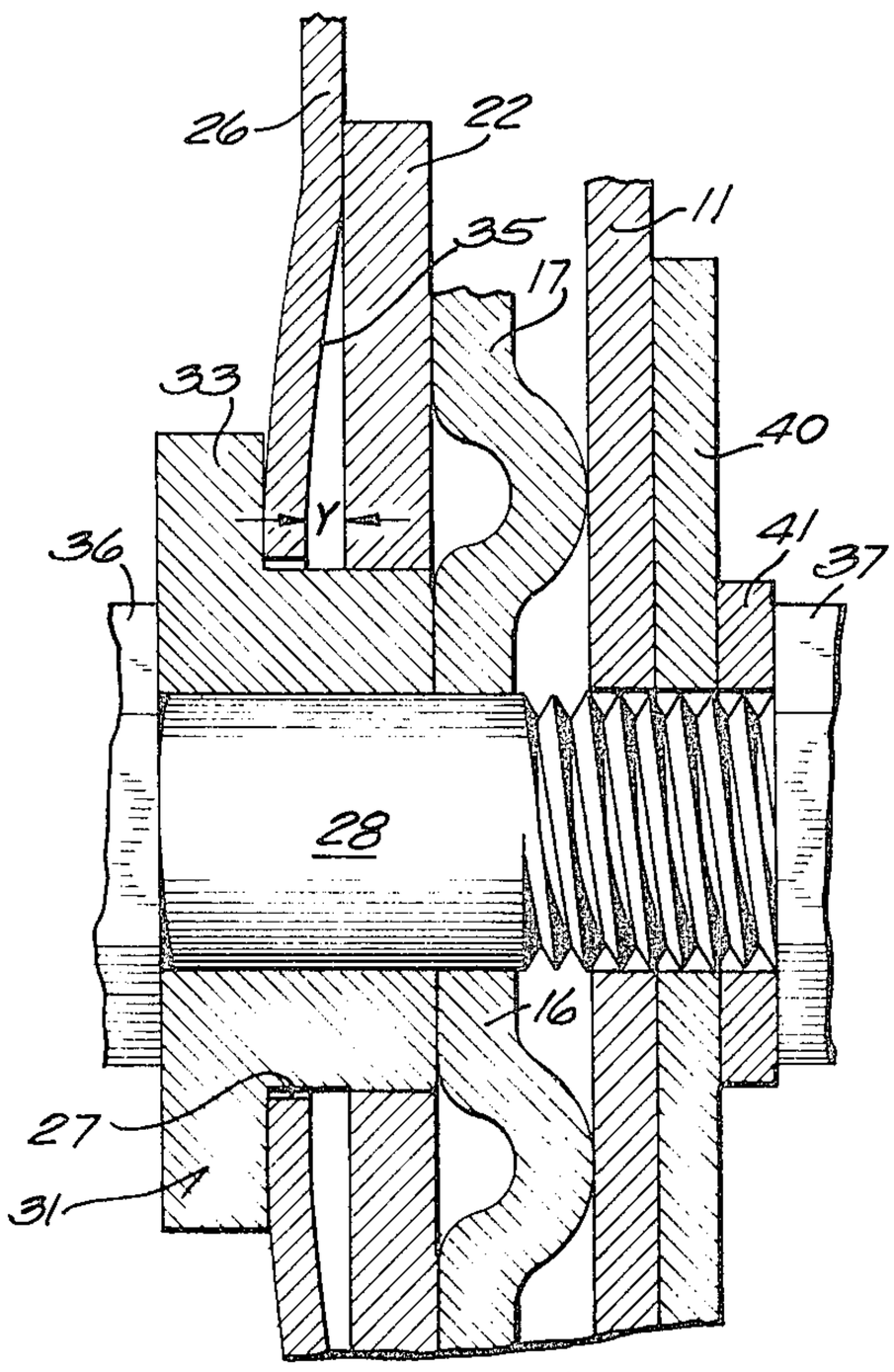
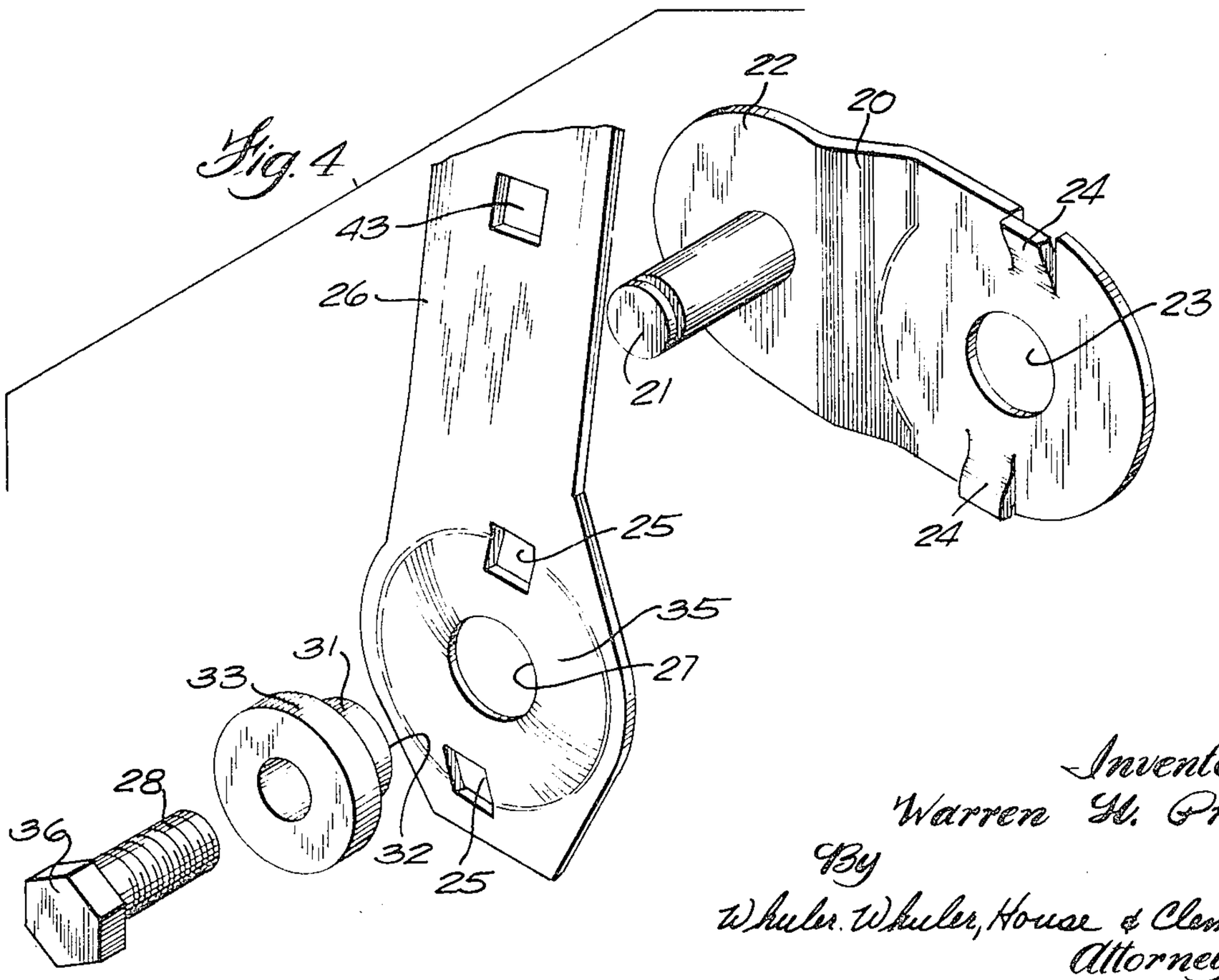


Fig. 6

Fig. 4



Inventor
Warren H. Price

By
Wheeler, Wheeler, House & Clemency
Attorneys

ADJUSTABLE WHEEL BRACKET ASSEMBLY

BACKGROUND OF THE INVENTION

An adjustable wheel bracket having a crank for an eccentrically mounted wheel and a spring lever by which the crank is adjusted is generally old. However, in prior devices of this type, considerable play develops between the crank and the spring lever, both because of manufacturing tolerances in part size and because of wear which develops during use. Conventional means for eliminating play, such as a wave washer between parts, have not proven satisfactory.

SUMMARY OF THE INVENTION

According to the present invention, play is eliminated between the parts without the need to resort to wave washers or other extraneous and additional elements. The spring lever is provided with a warp, such as a conical offset, near the inner end of the lever where it engages the crank. The lever and crank are embraced by a clamp by which axial pressure is exerted against the warp, thus to tension the warp and press the lever against the crank. This tension or spring bias eliminates play and takes up tolerances in the assembly.

Other objects, features, and advantages of the invention will appear from the disclosure.

DESCRIPTION OF DRAWINGS

FIG. **1** is a perspective view on a reduced scale of a rotary mower which is typical example of a wheeled device to which the invention is applicable.

FIG. **2** is a side elevation of an adjustable wheel bracket assembly embodying the invention.

FIG. **3** is a vertical cross section taken along the line **3**—**3** of FIG. **2**.

FIG. **4** is an exploded perspective view of the wheel crank, spring lever, clamp bushing and clamp bolt.

FIG. **5** is an enlarged cross section of the hub portion of the assembly prior to exerting clamping pressure on the shouldered bushing.

FIG. **6** is a cross section similar to that shown in FIG. **5**, but showing the parts after clamping pressure is exerted on the bushing.

DESCRIPTION OF PREFERRED EMBODIMENTS

Although the disclosure hereof is detailed and exact to enable those skilled in the art to practice the invention, the physical embodiments herein disclosed merely exemplify the invention which may be embodied in other specific structure. The scope of the invention is defined in the claims appended hereto.

The adjustable wheel bracket assembly of the present invention is typically applied to each of the four wheels **10** of the rotary mower shown in FIG. **1**. The assembly **12** comprises a backup plate **13** which is mounted fixedly to the skirt **11** of the mower deck, as shown in FIG. **3**.

The deck skirt **11** typically has an opening **14** through which a tang **15** on the backup plate **13** projects, thus to key the backup plate **13** in secure proper position with respect to the skirt deck **11**.

The backup plate **13** is provided with a series of concentric bosses, namely, an inner boss **16**, an intermediate boss **17**, and an outer boss **18**. These bosses face the swingable parts of the assembly, for purposes to be hereinafter described.

The vehicle wheel **10** is mounted on a stub axle **21** which projects laterally from the outer end of a swingable crank **22**. Crank **22** is made of stiff, heavy gauge steel, with an oblique intermediate portion **20**. The inner end of crank **22** has a central opening **23** and peripheral locking lugs **24**. The locking lugs **24** engage in corresponding locking apertures **25** near the inner end of a spring steel lever **26**. Lever **26** is relatively flexible and has a handle **29** at its outer end. At its inner end lever **26** has an opening **27** of substantially the same size as the

opening **23** in crank **22**.

The engagement of the crank lugs **24** in the lever apertures **25** couple the crank **22** and lever **26** so that these parts may be swung as a unit about the axis of a mounting bolt **28** on which the parts are mounted to the backup plate **13** and deck skirt **11**, as shown in FIG. **3**.

A bushing **31** shouldered at **33** (see FIG. **4**) supports the assembled crank **22** and spring lever **26** on the mounting bolt **28**. The end face **32** of bushing **31** seats against the boss **16** of backup plate **13** and bushing shoulder **33** seats against the inner end of the lever **26**. When the parts are assembled, as shown in FIGS. **3**, **5** and **6**, the inner ends of the crank **22** and the lever **26** are embraced between the shoulder **33** on the bushing **31** and the boss **17** of the backup plate **13**.

According to the present invention, the lever **26** is provided about its opening **27** with a conical offset or warp **35**. Warp **35** is of sufficient depth of offset so that when the inner ends of the crank **22** and the lever **26** are placed into face contact prior to tightening the clamp bolt **28**, as shown in FIG. **5**, the spacing "X" between the crank **22** and the bottom of the warp **35** will be on the order of 0.030–0.040 inch. In the FIG. **5** position of the parts, there will also be a spacing indicated at "Z" in FIG. **5** between the end face **32** of the bushing **31** and the boss **16** of the backup plate **13**.

Clamping pressure is developed on the warp **35** by the mounting bolt **28** and bushing **31**. Clamp bolt **28** has its head **36** engaged with the bushing **31** and has a nut **37** engaged with washers **40**, **41** which intervene between the nut **37** and the inner surface of the deck skirt **11**.

When clamp bolt **28** is tightened, it draws bushing **31** toward the backup plate **13**, thus to bottom the end face **32** of bushing **31** against the boss **16**, as shown in FIG. **6**. At the same time, bushing shoulder **33** draws the lever warp **35** toward the crank **22**, against the tension of the spring steel of which the lever is formed. Thus the warp **35** is reduced in depth and the spacing between the warp bottom and the crank **22** is reduced to the spacing "Y" indicated in FIG. **6**. Spacing "Y" is typically in the range of 0.015–0.020 inch.

In the course of tightening bolt **28**, the warp **35** is stressed to produce tension in the assembly, thus to spring bias the parts together and take up tolerances in the apparatus and eliminate play between the parts.

As is conventional, the height of the wheel **10** is adjusted by springing flexible lever **27** to its broken-line position shown in FIG. **3** and swinging the lever and crank about the axis of mounting bolt **28**. This action swings wheel axle **21** to a higher or lower position with respect to ground. Lever **26** is held in any selected position by one or another of the detents **42** which project from plate **13** and which selectively engage in the detent opening **43** in the lever **26**.

I claim:

1. In an adjustable wheel bracket assembly including a relatively stiff wheel axle crank, a relatively flexible adjusting lever keyed to the crank, a backup plate and detents with respect to which the lever is flexed in the course of adjusting lever position, the improvement to bias the lever and crank together under tension and thus to take up tolerance and eliminate play in the assembly and comprising a clamp for pressing the lever and crank together, said lever having a warp yieldable under clamp pressure to create tension in the lever and bias the assembly together without play between the assembled parts, said clamp comprising a bushing having an end face which engages the backup plate and a shoulder spaced from said face and in engagement with one of said crank and lever.

2. The assembly of claim **1** in which the backup plate has concentric coaxial inner and outer bosses, the end face of the bushing engaging the inner boss and the other of said crank and handle engaging the outer boss.

3. The assembly of claim **2** in which the clamp further comprises a bolt through said bushing and backup plate.

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