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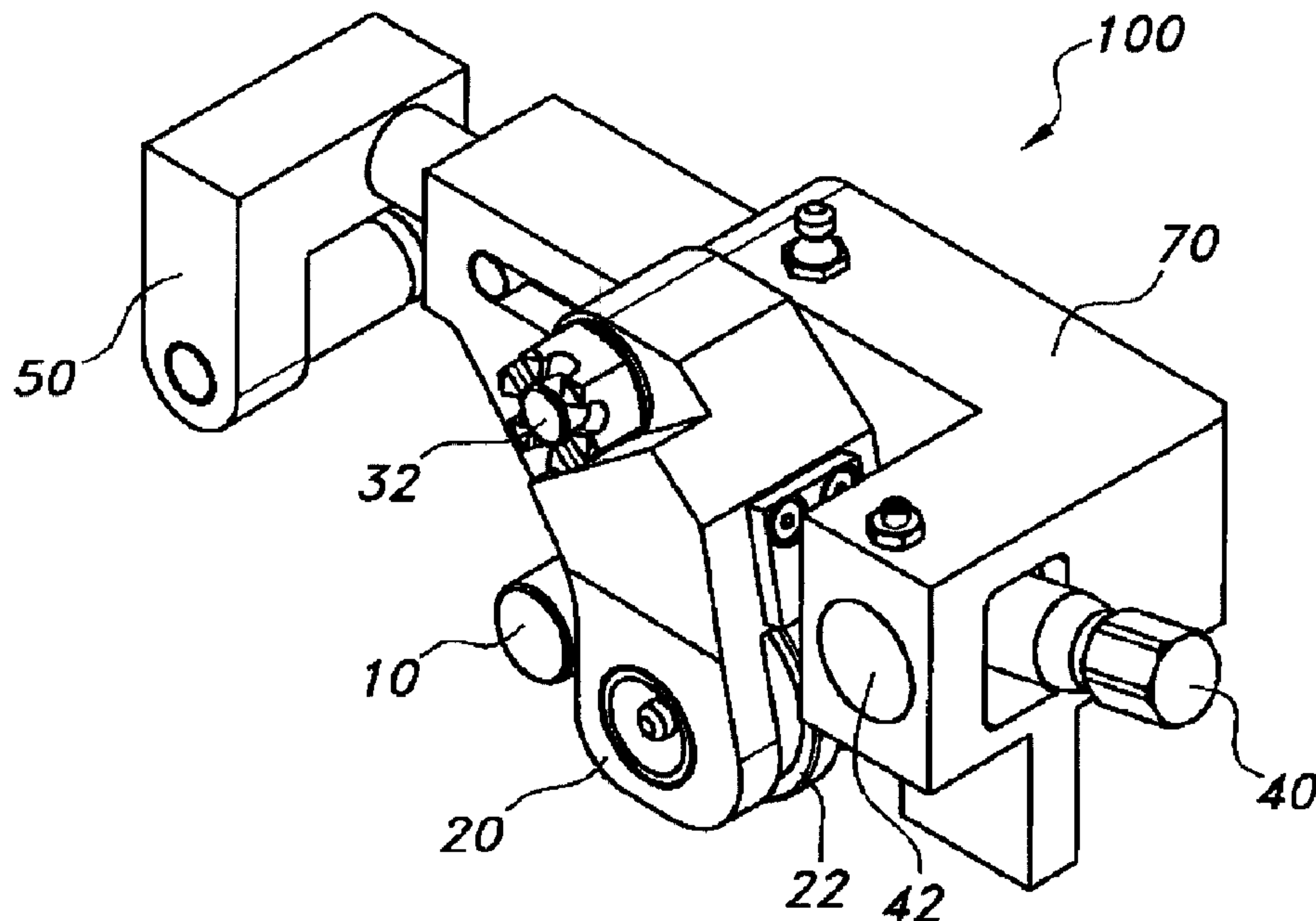
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(54) **Titre : DISPOSITIF DE RAINURAGE DE TUYAU**

(54) **Title: PIPE GROOVING DEVICE**



(57) **Abrégé/Abstract:**

A pipe grooving tool that works with commercially-available power drives. The tool attaches to the power drive using the existing tool assembly on the power drive, and allows a single operator to cut, ream and groove multiple pipe segments, without having to replace tools or otherwise alter the power drive and its tool assembly between grooving different pipe segments.

ABSTRACT

A pipe grooving tool that works with commercially-available power drives. The tool attaches to the power drive using the existing tool assembly on the power drive, and allows a single operator to cut, ream and groove multiple pipe segments, without having to replace tools or otherwise alter the power drive and its tool assembly between grooving different pipe segments.

PIPE GROOVING DEVICE

BACKGROUND INFORMATION

[0001] FIELD OF THE INVENTION

[0002] The invention relates to grooving tools, more specifically, a tool that can be used with an existing power drive for creating a groove on a pipe.

[0003] DISCUSSION OF PRIOR ART

[0004] Tools for cutting, threading and grooving pipes have been known for considerable time. Common power tools, such as the RIDGID 300 Power Drive, provide an assembly that combines tools for cutting, reaming and threading a pipe. Such tools are typically used by inserting a pipe through a center opening in the power drive and securing it in place by a vice. Actuating the drive causes the pipe to spin. A user then applies the cutting device to cut the pipe to the desired length, and then uses the reamer to remove the inside burrs. A threading die-head may then be used to thread the end of the pipe.

[0005] If a user wishes to groove the pipe, he must remove the entire tool assembly and attach an external grooving tool that is used to create a groove on the pipe. The typical grooving tool is attached to the power drive which causes a grooving axle to rotate. A pipe is then placed over the end of the axle and a groove is created in the pipe. This often results in a situation in which an additional operator has to hold the opposite end of a long piece of pipe as it is being grooved. Should the operator then wish to cut the next section of pipe, the grooving tool has to be removed and the cut/ream/thread assembly reattached, creating a cumbersome process when an operator needs to cut and groove many pieces of pipe.

[0006] What is needed is a grooving tool that works with the original assembly. What is further needed is such a grooving tool that does not require the exchange of tools to cut and then groove a piece of pipe. What is yet further needed is such a grooving tool that is operable by a single operator.

BRIEF SUMMARY OF THE INVENTION

[0007] The invention is a pipe grooving device that works with an existing power drive. Conventional power drives have tool assemblies that include pipe cutters, reamers, and threaders. The device according to the invention works within this type of assembly, making use of the power drive to perform its intended function.

[0008] The grooving device has an attachment assembly that secures the device to the power drive's tool assembly, possibly replacing an existing tool, and a freewheeling groove shaft that supports the position of a pipe. Once the device is secured to the power drive's tool assembly and placed in the proper position, a pipe is placed through a center opening in the power drive, over the groove shaft and secured to the power drive by a vice. The power drive and vice are capable of supporting the weight of long pieces of pipe. Actuating the power drive causes the pipe to spin.

[0009] The grooving device also has a wheel housing that contains a groove wheel and an activation rod that is operatable by a user. Operating the activation rod applies pressure to the wheel housing, causing the pipe to be pinched between the groove wheel and groove shaft and creating a groove on the pipe.

[0010] The grooved pipe is then cut or simply removed from the power drive, and the operator may proceed with cutting and grooving the next segment of pipe without having to alter the power drive or its tool assembly.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The present invention is described with reference to the accompanying drawings. In the drawings, like reference numbers indicate identical or functionally similar elements. The drawings are not drawn to scale.

[0012] FIG. 1 is a perspective view of the device according to the invention.

[0013] FIG. 2 is a side view of the device.

[0014] FIG. 3 is a bottom view of the device.

[0015] FIG. 4 is a side view of the device attached to a power drive.

[0016] FIG. 5 is a top view of the device attached to a power drive, showing a pipe in the power drive.

[0017] FIG. 6 is a perspective view of the device housing.

[0018] FIG. 7 is a side view of the device housing.

[0019] FIG. 8 is a side view of the wheel housing assembly.

[0020] FIG. 9 is a front view of the wheel housing assembly.

[0021] FIG. 10 is a perspective view of the wheel housing assembly.

[0022] FIG. 11 is a perspective view of the wheel housing.

[0023] FIG. 12 is a perspective view of the wheel axle.

[0024] FIG. 13 is a perspective view of the pivot pin.

[0025] FIG. 14 is a perspective cross-sectional view of the wheel.

- [0026] FIG. 15 is a perspective view of the groove shaft.
- [0027] FIG. 16 is a side view of the groove shaft.
- [0028] FIG. 17 is a side view of the activation rod.
- [0029] FIG. 18 is a perspective view of the activation rod securing unit.
- [0030] FIG. 19 is a perspective view of the device showing a second embodiment of the wheel housing and device housing.
- [0031] FIG. 20 is a side view of the device showing a second embodiment of the wheel housing and device housing.
- [0032] FIG. 21 is a perspective view of a second embodiment of the wheel housing.
- [0033] FIG. 22 is a perspective view of a second embodiment of the device housing.
- [0034] FIG. 23 is a perspective view of the attachment assembly.

DETAILED DESCRIPTION OF THE INVENTION

[0035] The present invention will now be described more fully in detail with reference to the accompanying drawings, in which the preferred embodiments of the invention are shown. This invention should not, however, be construed as limited to the embodiments set forth herein; rather, they are provided so that this disclosure will be complete and will fully convey the scope of the invention to those skilled in the art.

[0036] FIGS. 1, 2, and 3 illustrate a pipe grooving device 100 according to the invention that includes a groove shaft 10, a wheel housing assembly 20, an activation rod 40 and an attachment assembly 50, each contained in a device housing 70. The device 100 attaches to a power drive D, shown in FIGS. 4 and 5, by attachment assembly 50. A pipe P is inserted through the power drive D and placed over the groove shaft 10 and secured in the power drive D by a vice V.

[0037] Activating the power drive D causes the pipe P to rotate about the groove shaft 10. A user operates the activation rod 40 by, for example, attaching a socket wrench (not shown) to the activation rod 40 and rotating the wrench. As the activation rod 40 rotates it applies pressure to the wheel housing assembly 20. The wheel housing assembly 20 has a groove wheel 22 that presses against the pipe P as the power drive rotates the pipe P and the user operates the activation rod 40, pushing the pipe P into a groove recess 16 on the groove shaft 10 creating the groove in the pipe P.

[0038] FIGS. 6 – 14 illustrate first embodiments of the device housing 70 and wheel housing 20. The device housing 70 is a solid piece of material that has been formed to support the wheel housing assembly 20, activation rod 40, groove shaft 10, and attachment assembly 50. The groove shaft 10 is mounted in a bearing assembly 72 that includes one or more bearings and is free to rotate. The wheel housing 20 is pivotably coupled to the device housing 70 by a pivot pin 32 that is shown in FIGS. 1 and 2 and that is inserted through a through-bore pivot point 74 and through a housing attachment bore 28. A securing unit 42, shown in FIGS 1, 2 and 18, is inserted through a rod insertion bore 76. The activation rod 40 is adjustably inserted through the securing unit 42 and is in contact with the wheel housing 20 at a location beneath the pivot point 74. The attachment assembly 50 is fixedly coupled to the device housing 70 at an attachment slot 78.

[0039] FIGS. 11 – 14 illustrate details of the wheel housing assembly **20**, which includes the groove wheel **22**, an axle **24**, a housing **26** and a housing attachment opening **28**. The axle **24** is secured in the housing **26** through housing openings **27A, 27B**. The wheel **22** is coupled to the axle **24**. A center portion **22A** of the wheel **22** protrudes outward from the wheel **20**, such that, when the wheel **20** is pressed against the pipe **P**, the center portion **22A** is forced into the pipe **P**, thereby forming a groove.

[0040] FIGS. 15 and 16 illustrate the groove shaft **10**. The groove shaft **10** has a stepped diameter, including a shaft connection diameters **12** and **12A**, and pipe fitting diameters **14A, 14B**. The groove recess **16** is formed between pipe fitting diameters **14A, 14B**. The shaft connection diameters **12** and **12A** are mounted in the bearing assembly **72** in the device housing **70**. The pipe **P** fits over the pipe fitting diameters **14A, 14B**, which are sized to allow the removal of the pipe once the groove has been created. As the user operates the device the power drive rotates the pipe **P**, the center portion of the wheel **22A** presses against the pipe **P**, pushing the pipe **P** in the direction of the groove recess **16** and forming the groove in the pipe **P**.

[0041] FIG. 17 illustrates the activation rod **40**, which is inserted through and secured by the securing unit **42**, shown in **FIG. 18**. A first end **44** of the activation rod **40** is shaped to fit against and apply pressure to the wheel housing **20**, while a second end **46** is shaped to be manipulated by an operator. For example, the second end **46** may be shaped to fit a socket wrench that can then be tightened or loosened by an operator to apply more or less pressure to the wheel housing unit **20** as desired. The securing unit **42** is fixedly attached to the device housing **70** at a rod connection point **79**, shown in **FIGS. 6 and 7**. In one embodiment the activation rod **40** is threaded and the securing unit **42** has a threaded bore **48** through which the activation rod **40** is inserted and adjusted.

[0042] FIGS 19 – 23 illustrate second embodiments of the device housing 70 and the wheel housing 20. Again the device housing 70 is a solid piece of material that has been formed to support the wheel housing assembly 20, activation rod 40, groove shaft 10, and attachment assembly 50. The groove shaft 10 and bearing assembly 72 are the same as shown in the first embodiment. The wheel housing 20 is pivotably attached to a pivot point 74 by a pivot pin 32. A securing unit 42 is inserted through an activation rod insertion slot 76. The activation rod 40 is adjustably inserted through the securing unit 42 and fixedly connected to the top of the wheel housing 20 by a connection rod 71 that is affixed to the upper housing openings 23. Operating the activation rod pushes or pulls the top of the wheel housing 20, causing the groove wheel 22 to apply or release pressure against the pipe P depending on the direction of operation. An adjustment stop 47 may be provided to limit how far the user is able to turn the activation rod 40.

[0043] The wheel housing assembly 20 includes a groove wheel 22, an axle 24, a housing 26 and a housing attachment opening 28 and is attached to the device housing 70 as shown in the first embodiment. In this second embodiment, the first end of the activation rod 44 is secured to the wheel housing 20 at a point above the pivot point 74. Operating the second end 46, by, for example, turning the wrench, causes the top of the housing to be pulled away from the groove shaft 10 or pushed towards the groove shaft 10, depending on the direction of the rotation, causing the wheel 22 to press against or pull away from the pipe P.

[0044] FIG. 24 illustrates the attachment assembly 50, including a housing 52, a device attachment shaft 54 and a power drive attachment shaft 56. The housing 52 secures the two shafts 54 and 56. The device attachment shaft 54 secures the attachment assembly 50 to the device housing 70 at a connection slot 78, shown in FIGS. 6 and 7. The connection slot 78 is wider than the attachment shaft 54 which allows the device 100 to be moved in or out relative to the pipe in order to allow the

pipe grooving device **100** to groove pipes of varying size. The power drive attachment shaft **56** pivotably couples the device **100** to the power drive **D**.

[0045] It is understood that the embodiments described herein are merely illustrative of the present invention. Variations in the construction of the pipe grooving device may be contemplated by one skilled in the art without limiting the intended scope of the invention herein disclosed and as defined by the following claims.

What is claimed is:

Claim 1: A pipe grooving device that is couplable to a power drive, the pipe grooving device comprising:

 a device housing having a groove shaft and an attachment assembly, the attachment assembly being attachable to the power drive;

 a wheel housing assembly pivotably connected to the device housing;

 an activation rod adjustably connected to the device housing;

 wherein turning the activation rod causes the wheel housing assembly to move toward or away from the groove shaft, depending on the direction of the rotation.

Claim 2: The device of claim 1 wherein the device housing includes a bearing assembly and wherein the groove shaft is mounted in the bearing assembly, so as to be freely rotatable.

Claim 3: The device of claim 2 wherein the wheel housing assembly includes a groove wheel having a center portion that protrudes outward from the wheel;

 wherein the groove shaft has a recess; and

 wherein rotating the activation rod in a manner that moves the wheel housing assembly towards the groove shaft causes the center portion of the groove wheel to move towards the recess in the groove shaft.

Claim 4: The device of claim 3 wherein the activation rod is inserted through and secured to the device housing by a rod securing unit and has a first end that is shaped to fit against and apply pressure to the wheel housing assembly and has a second end rotatable by a user and wherein rotating the activation rod causes the

first end to selectively apply or relieve pressure to the wheel housing assembly, depending on the direction of rotation.

Claim 5: The device of claim 3 wherein the activation rod is adjustably inserted through a rod securing unit and is fixedly connected to the wheel housing and wherein rotating the activation rod pulls or pushes the top of the wheel housing assembly causing the wheel to move towards or away from the groove shaft, depending on the direction of rotation.

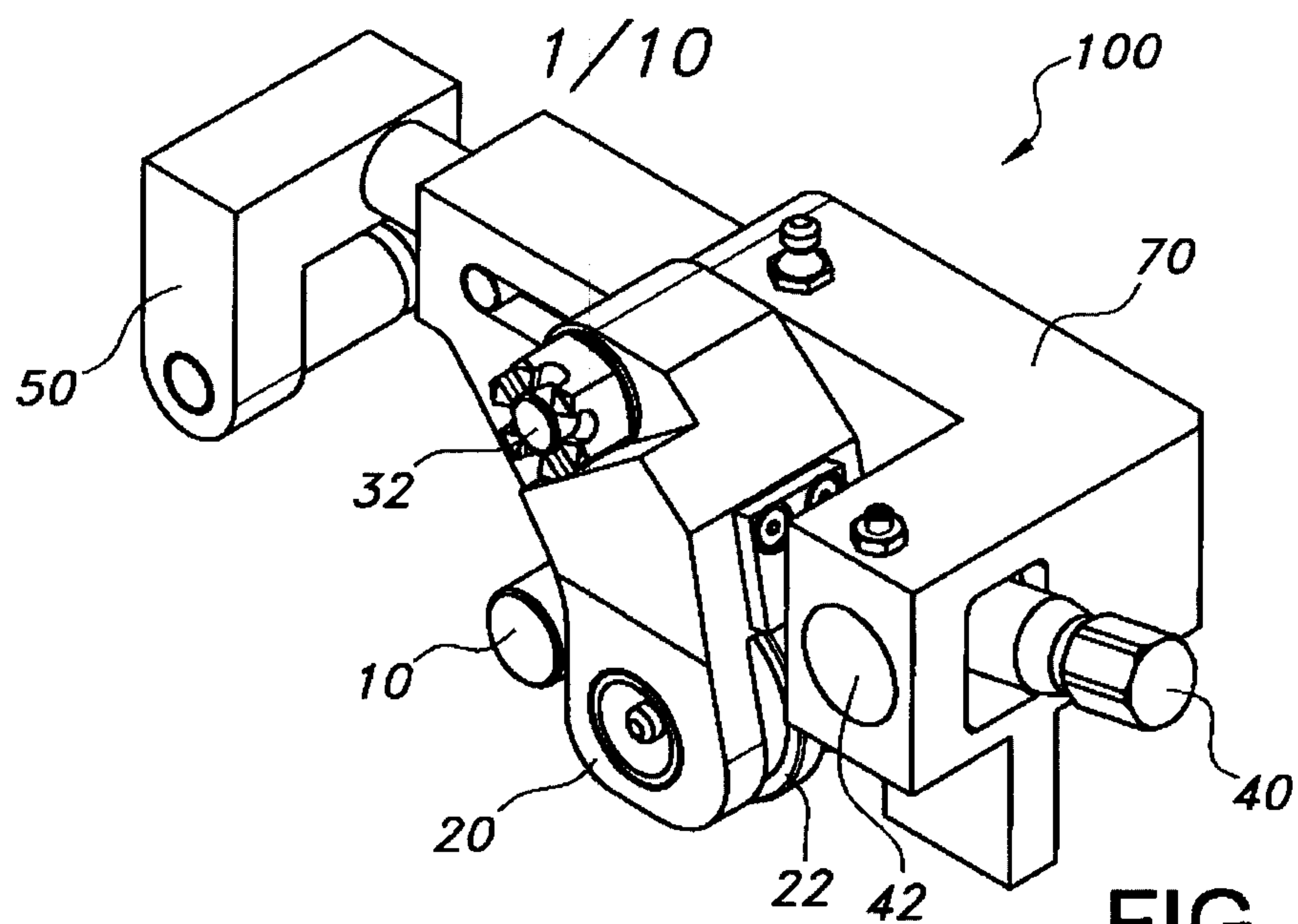


FIG. 1

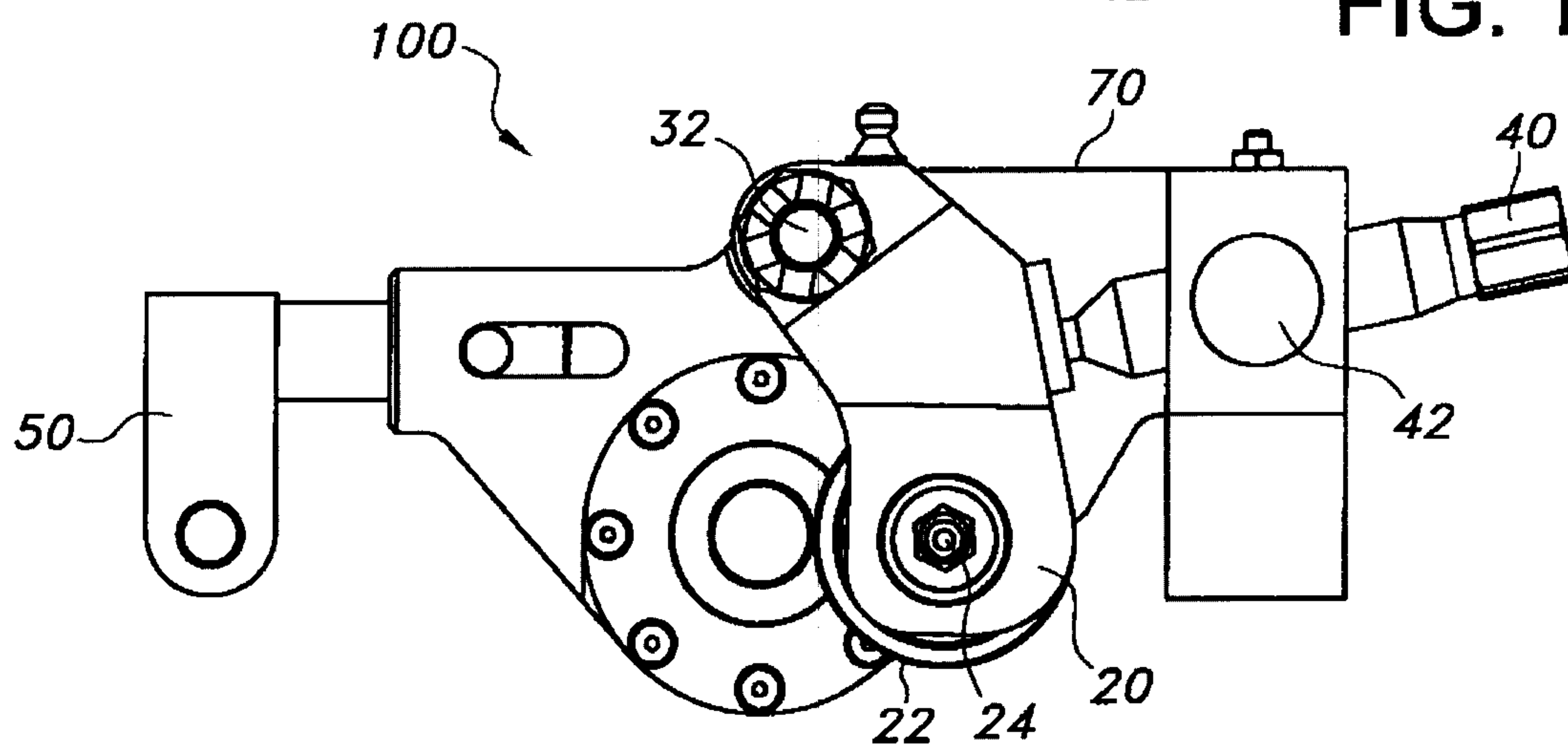


FIG. 2

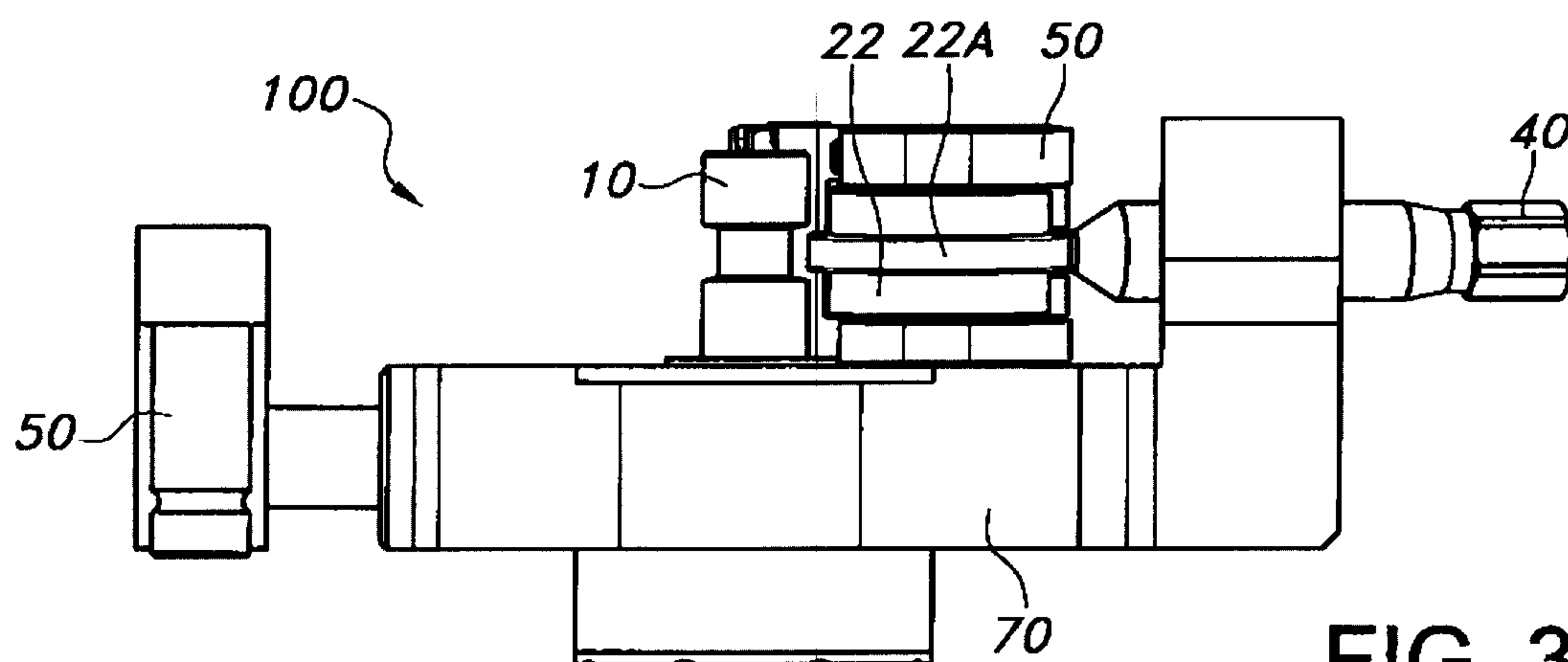


FIG. 3

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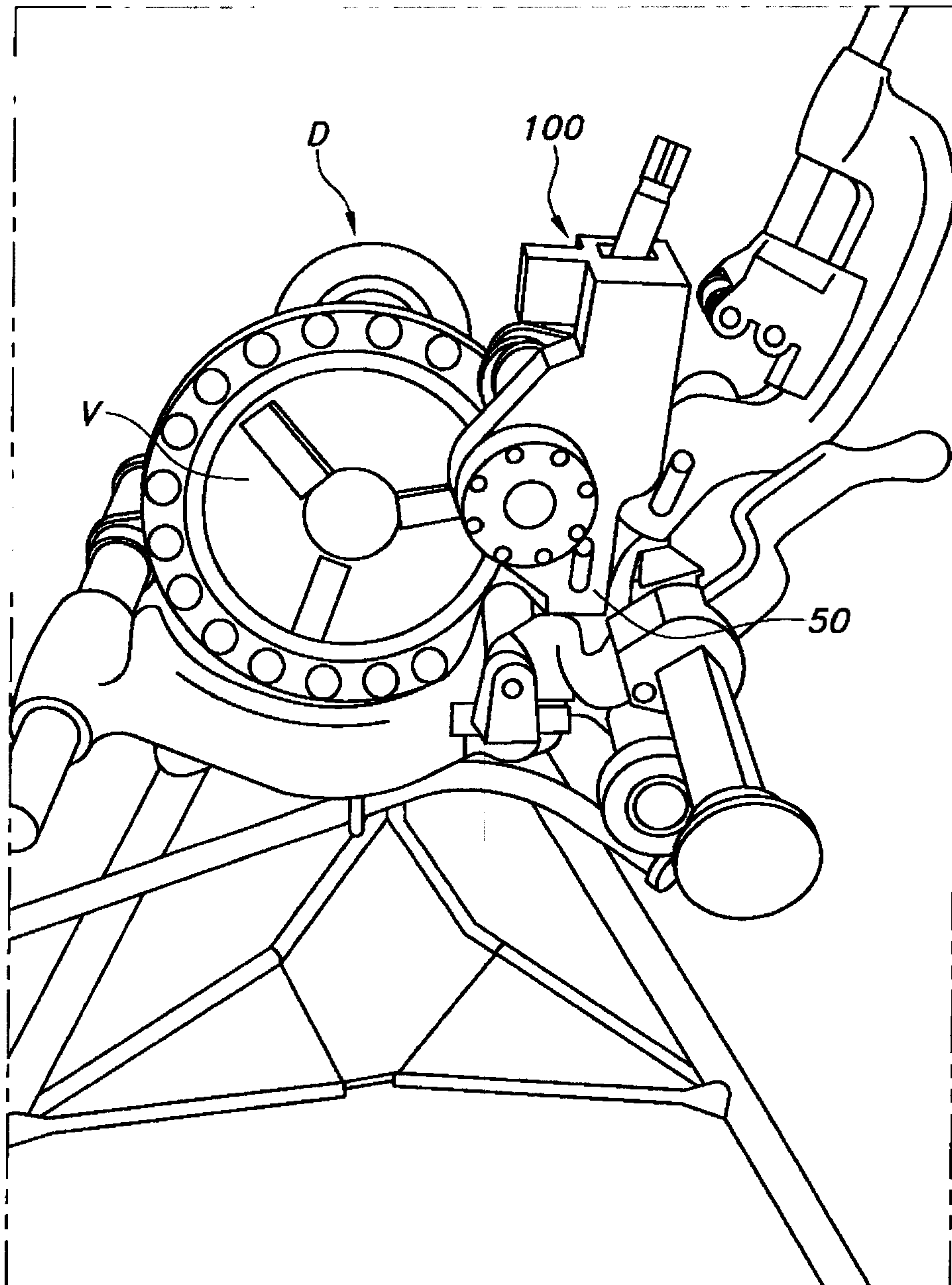


FIG. 4

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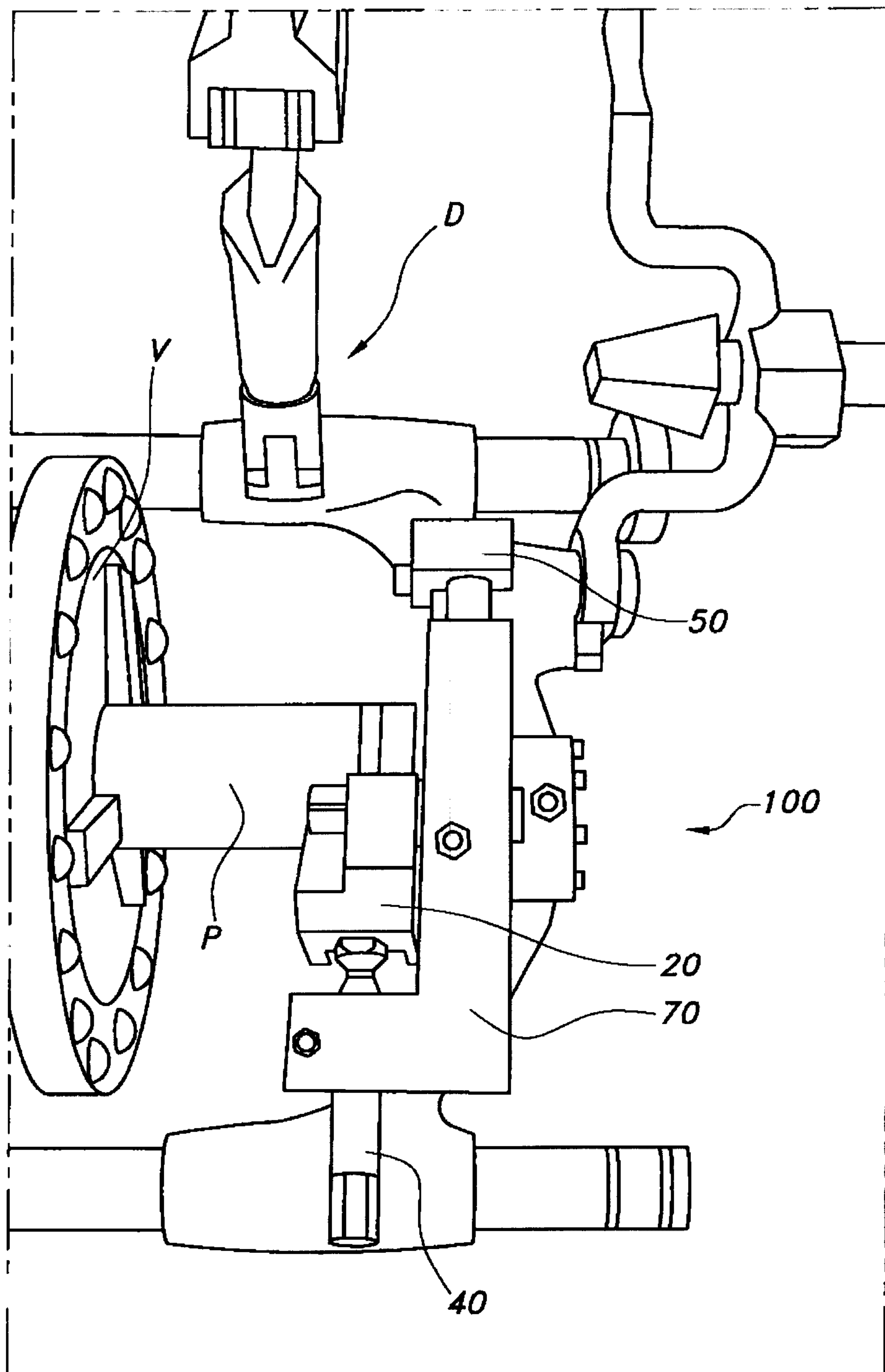


FIG. 5

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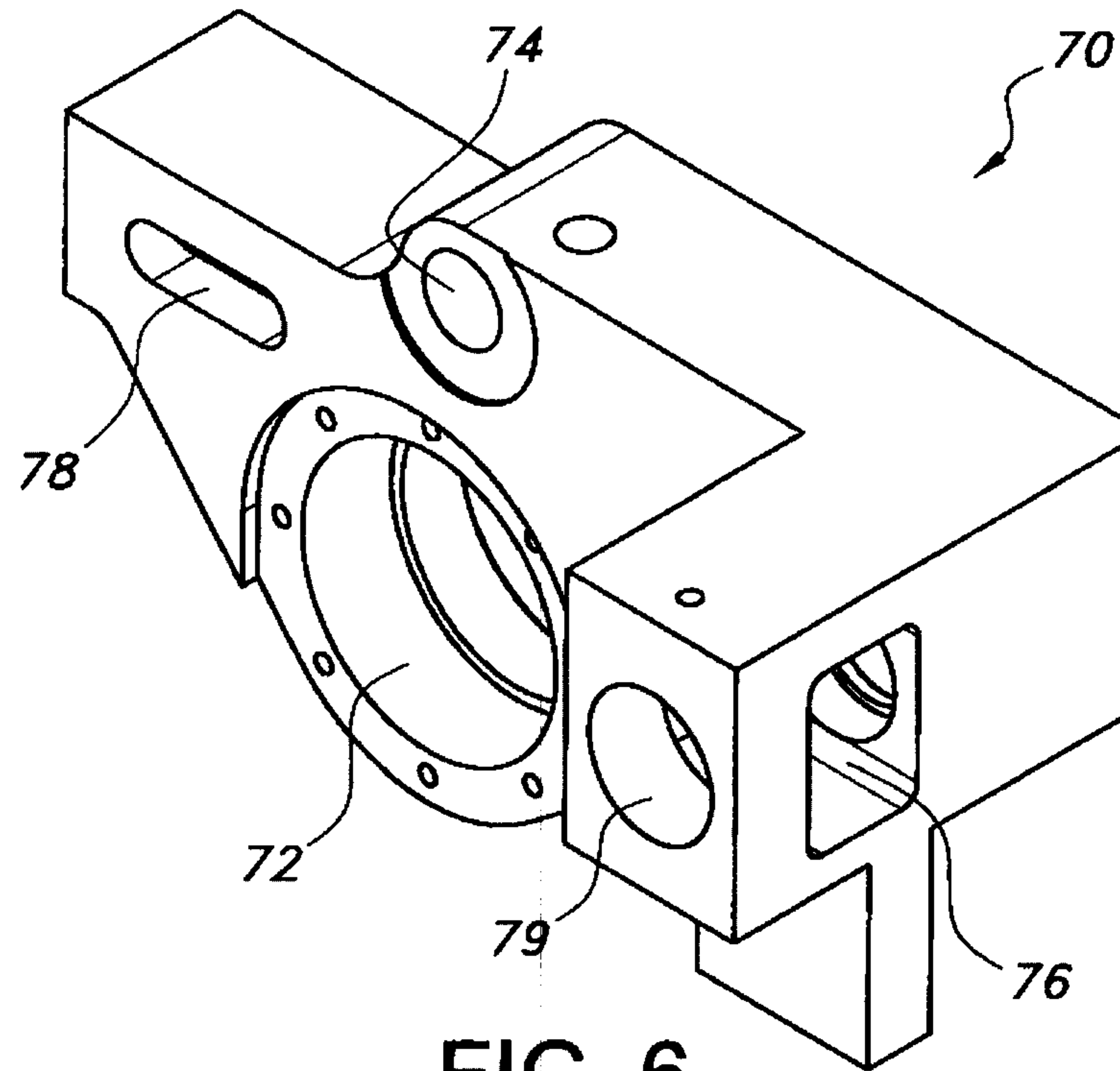


FIG. 6

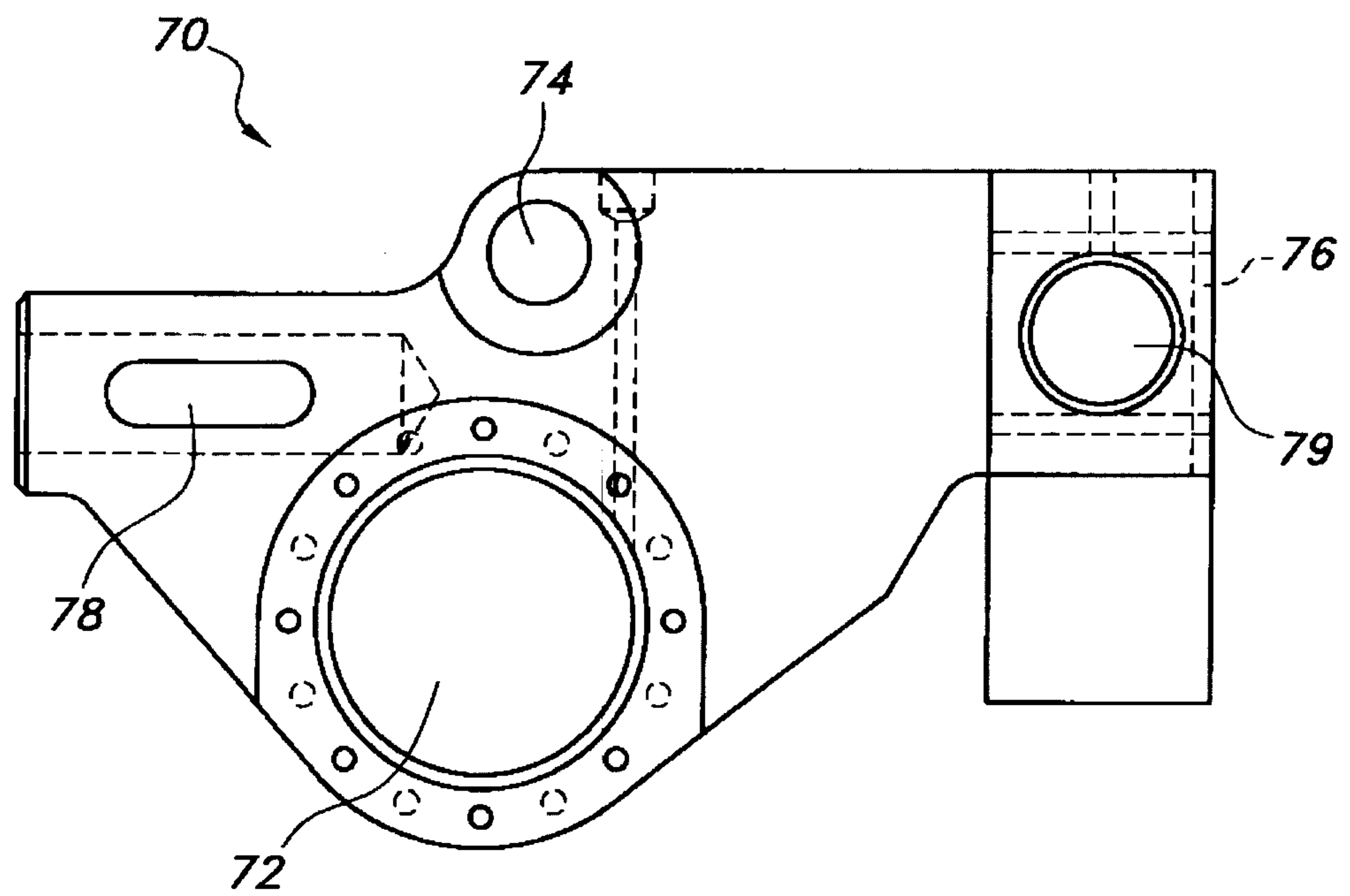
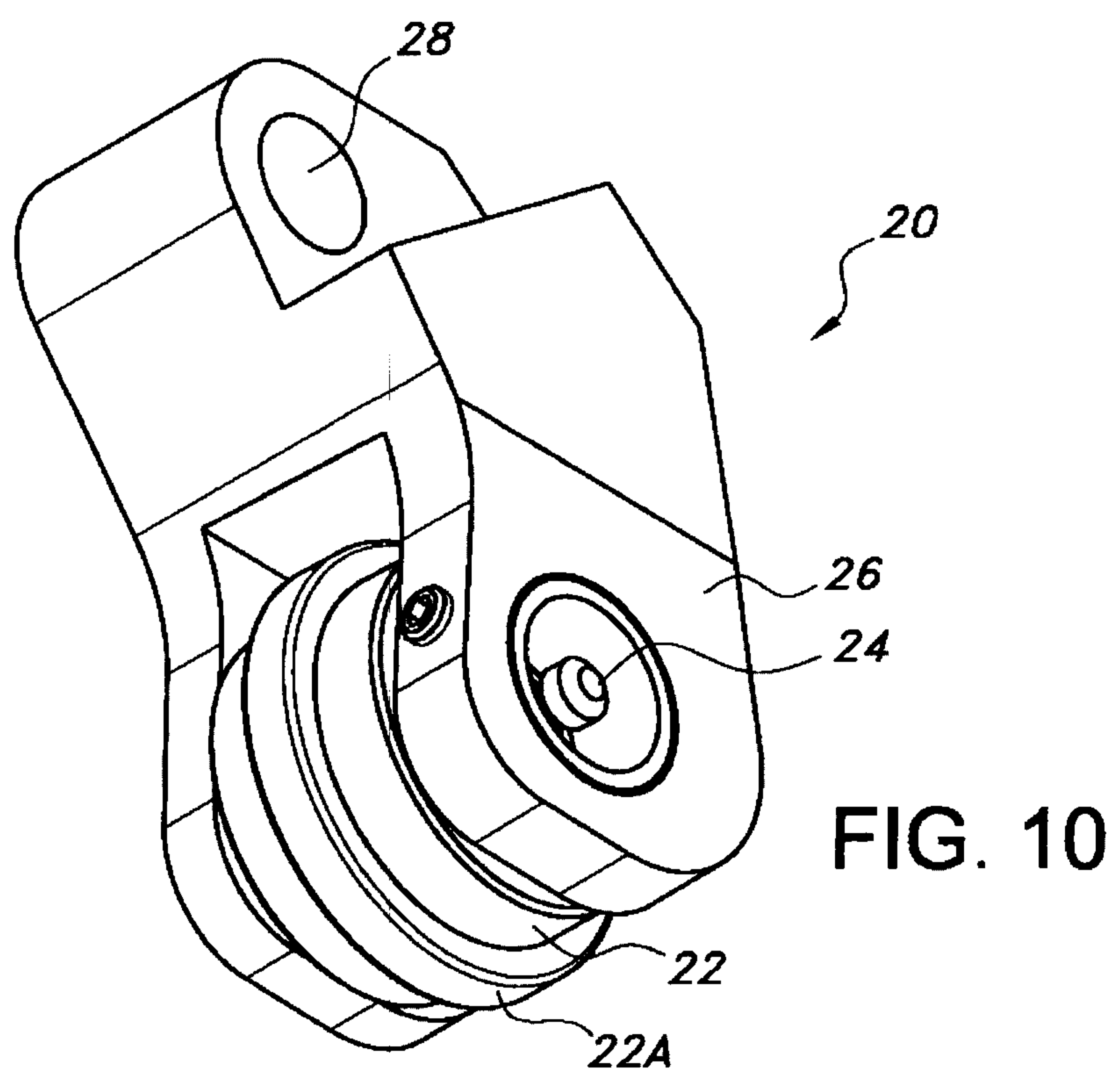
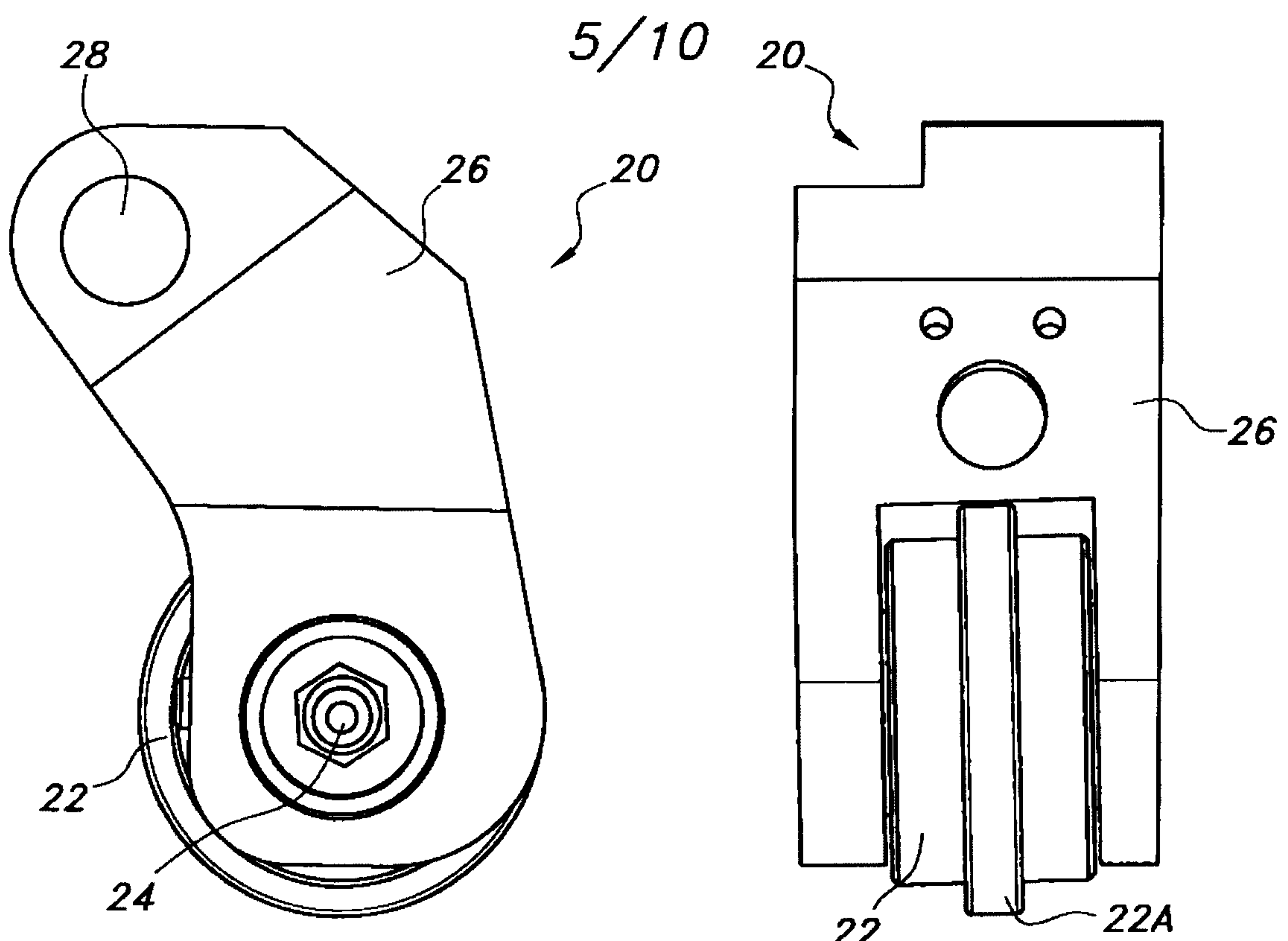


FIG. 7



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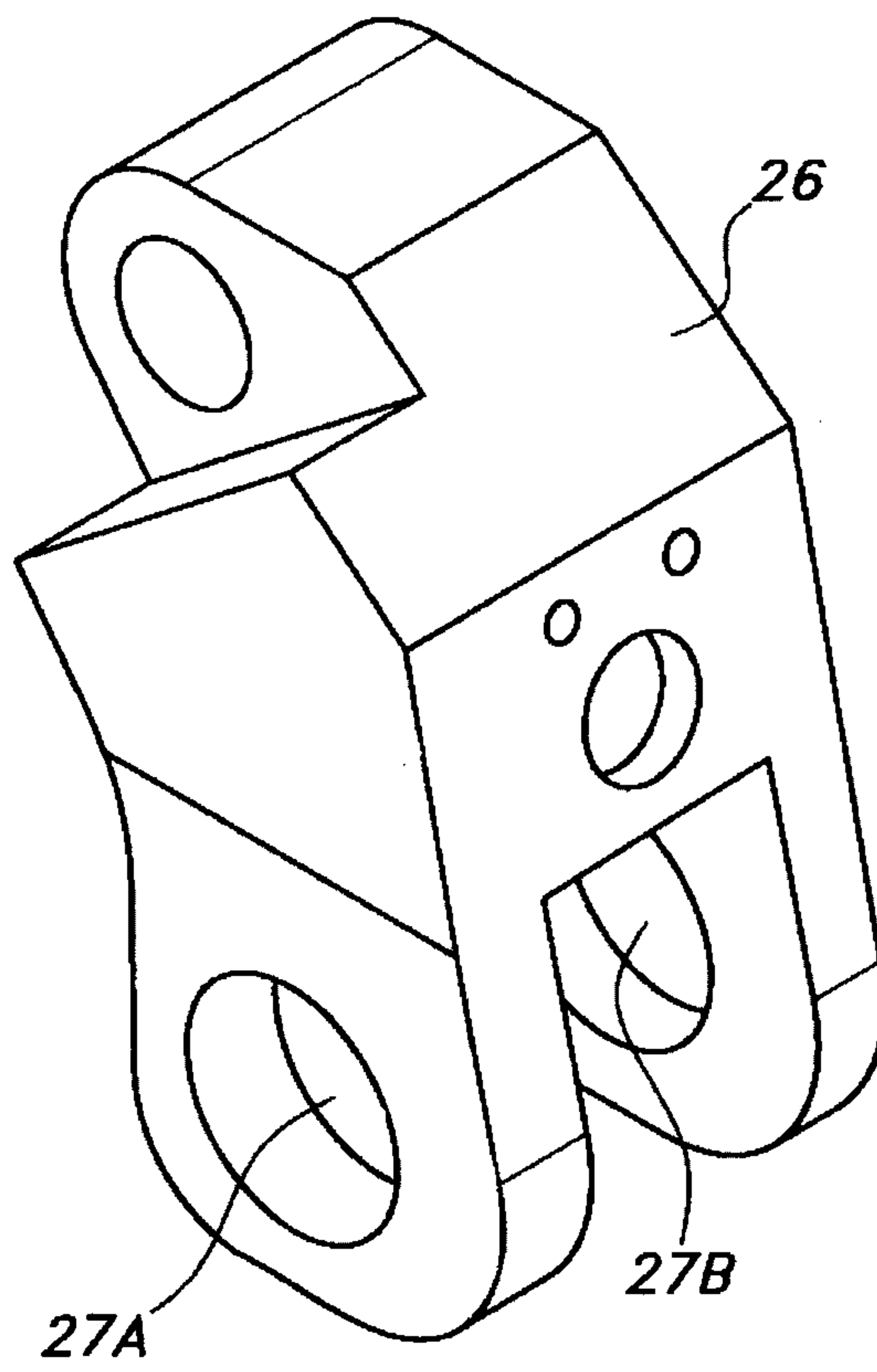


FIG. 11

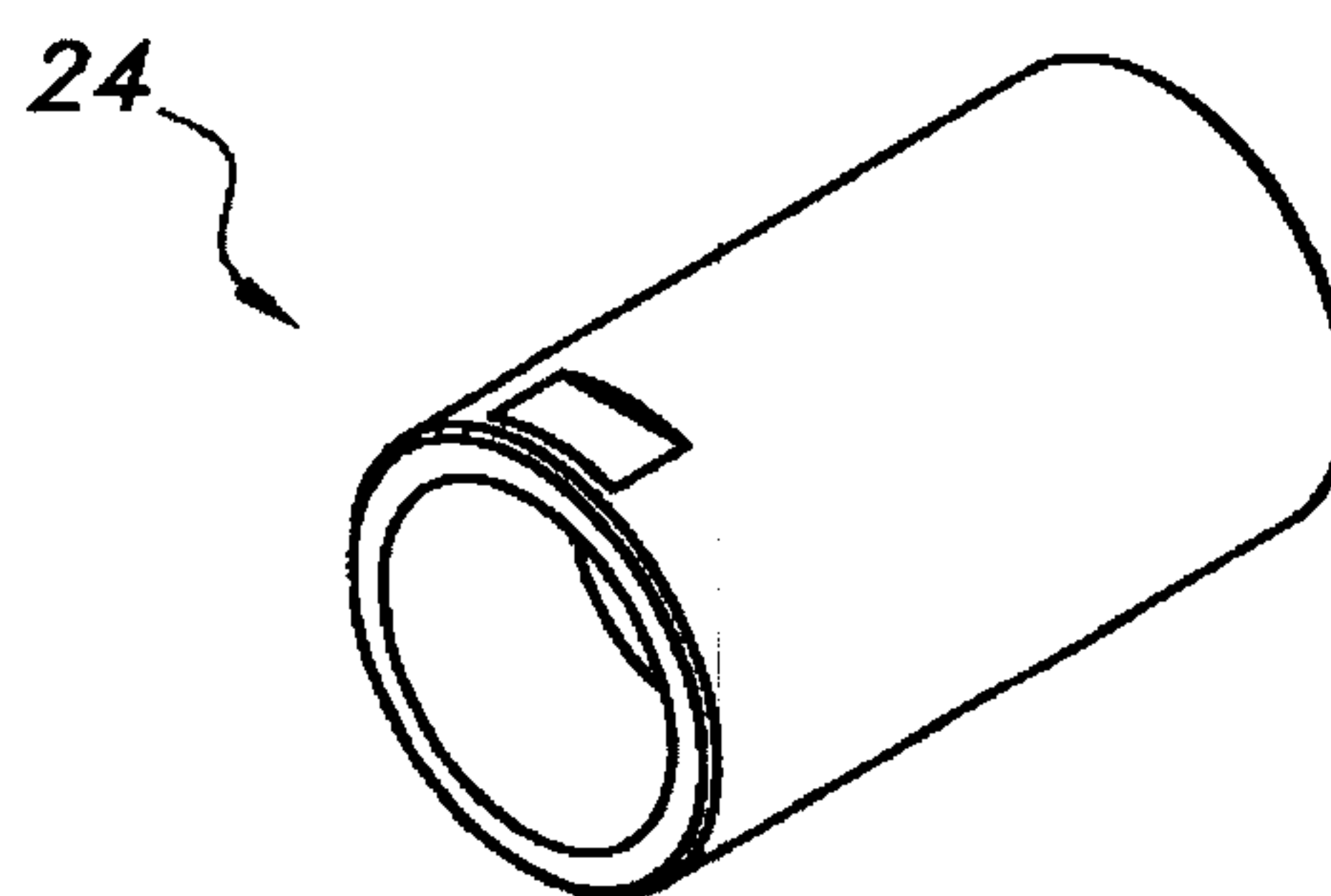


FIG. 12

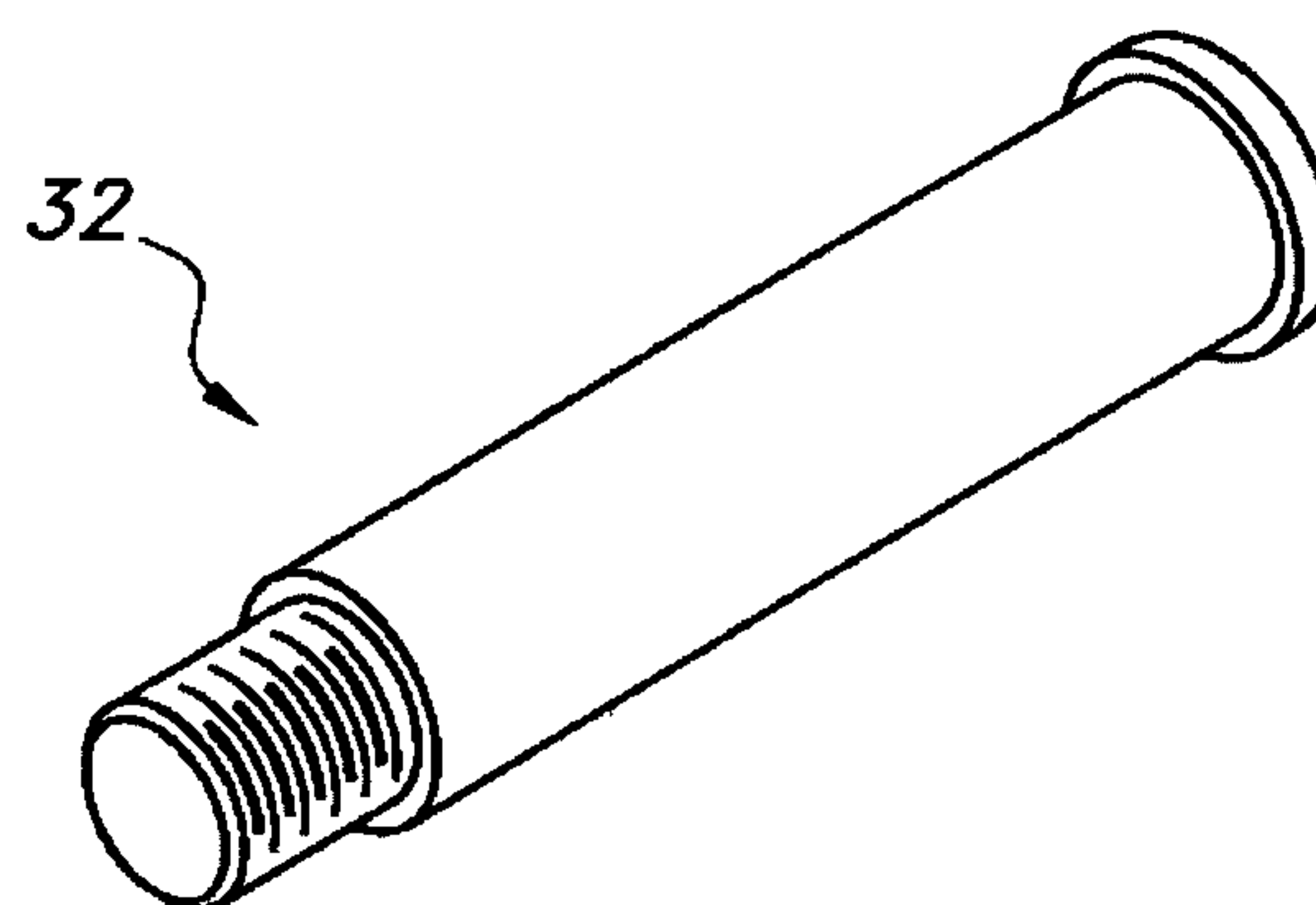


FIG. 13

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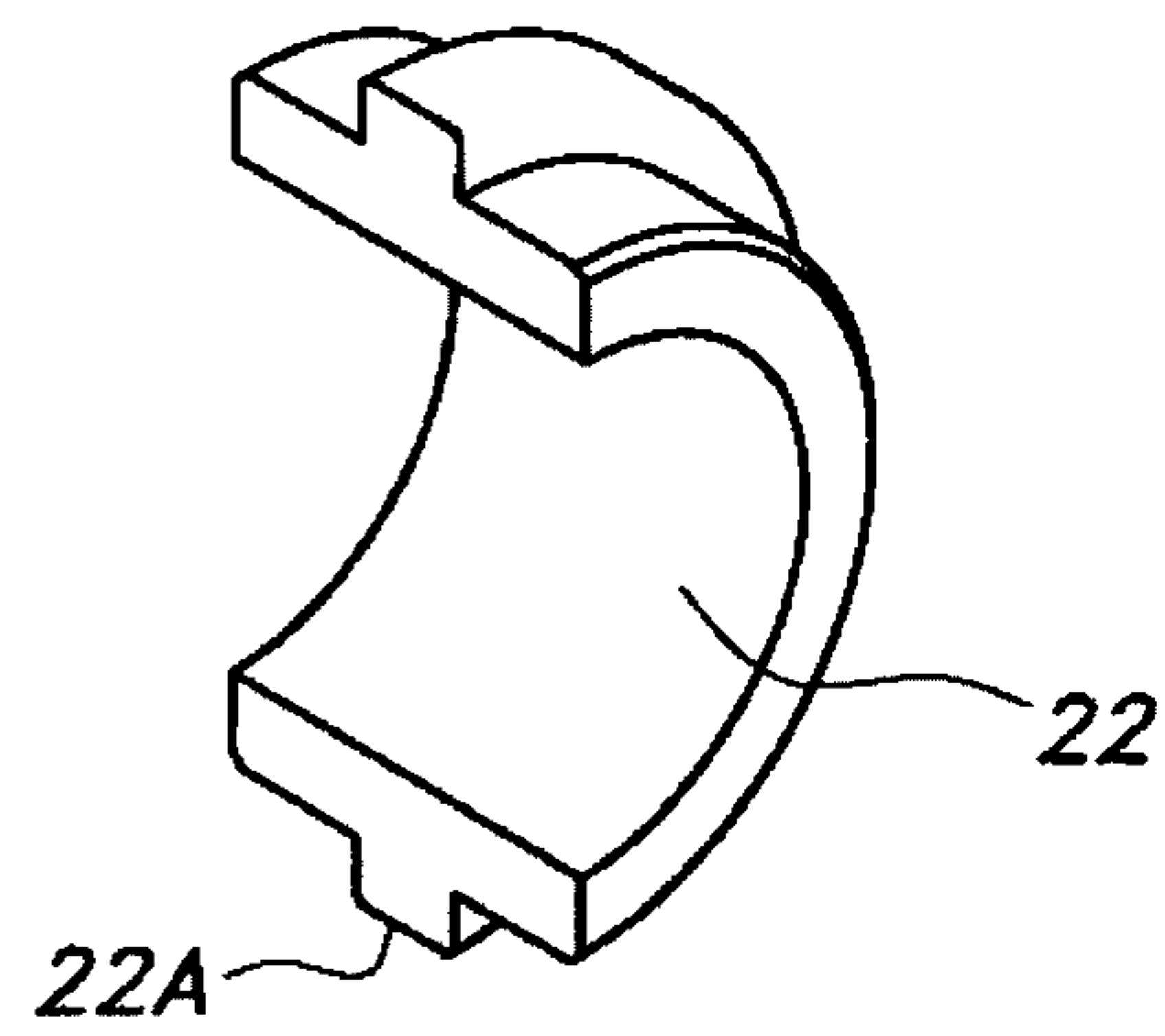


FIG. 14

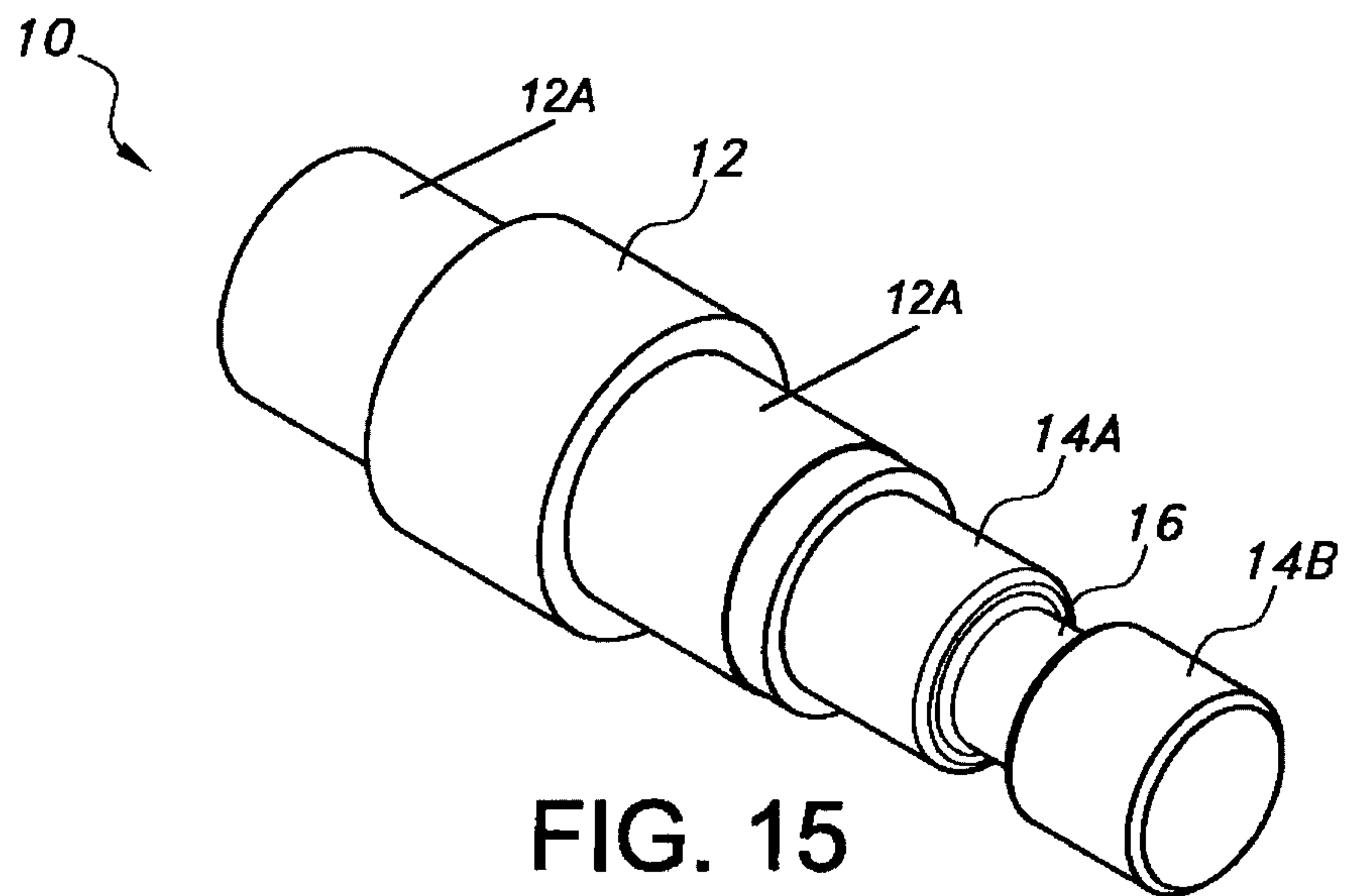


FIG. 15

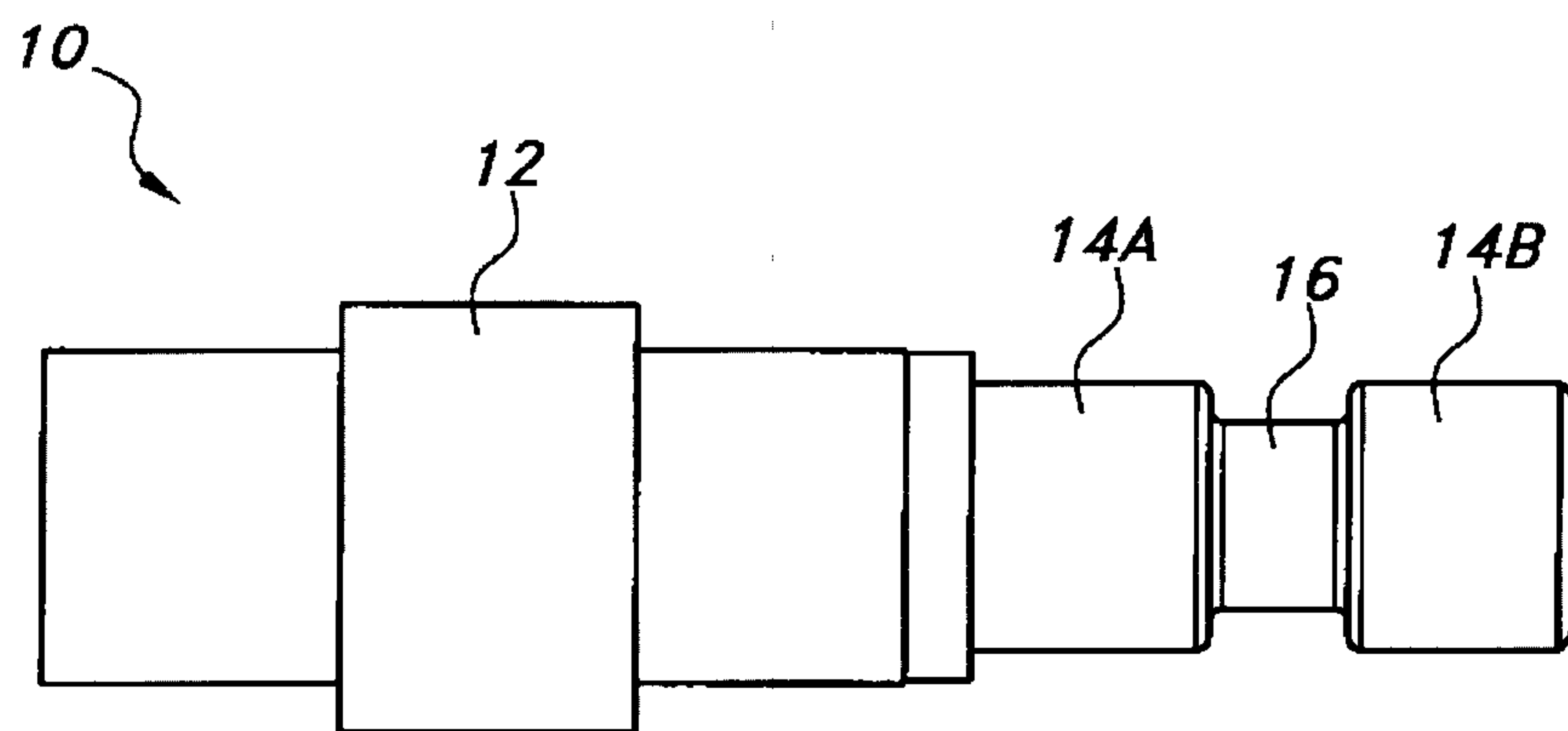


FIG. 16

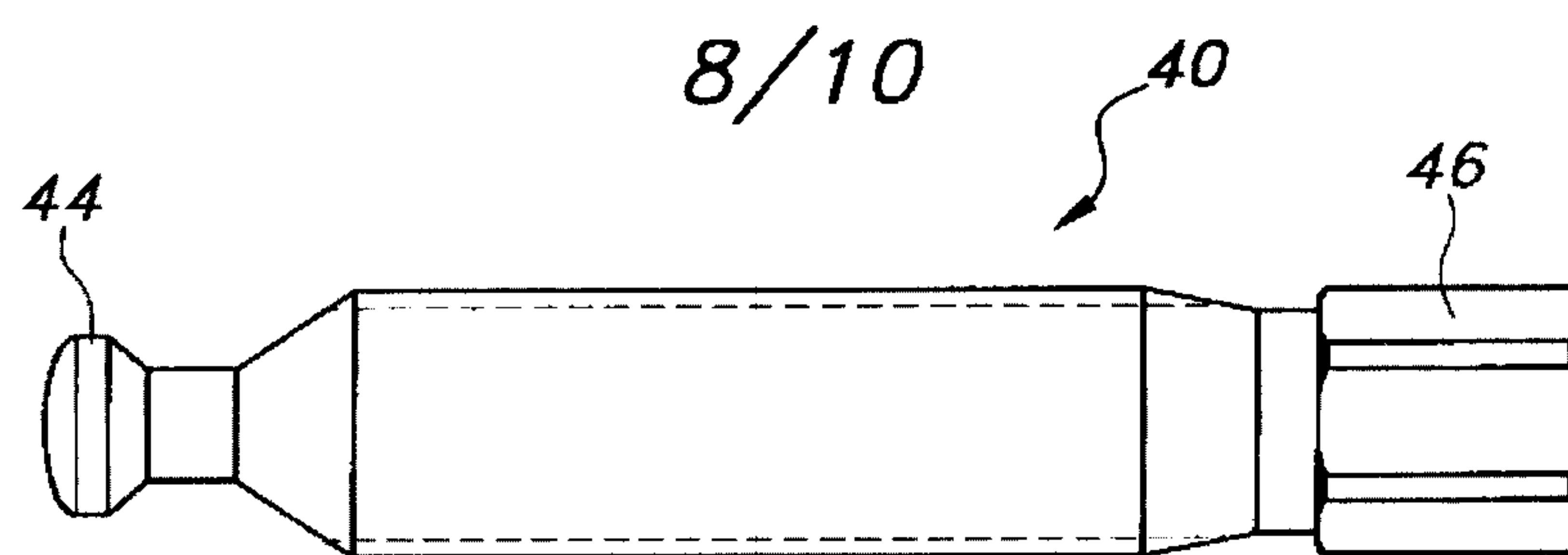


FIG. 17

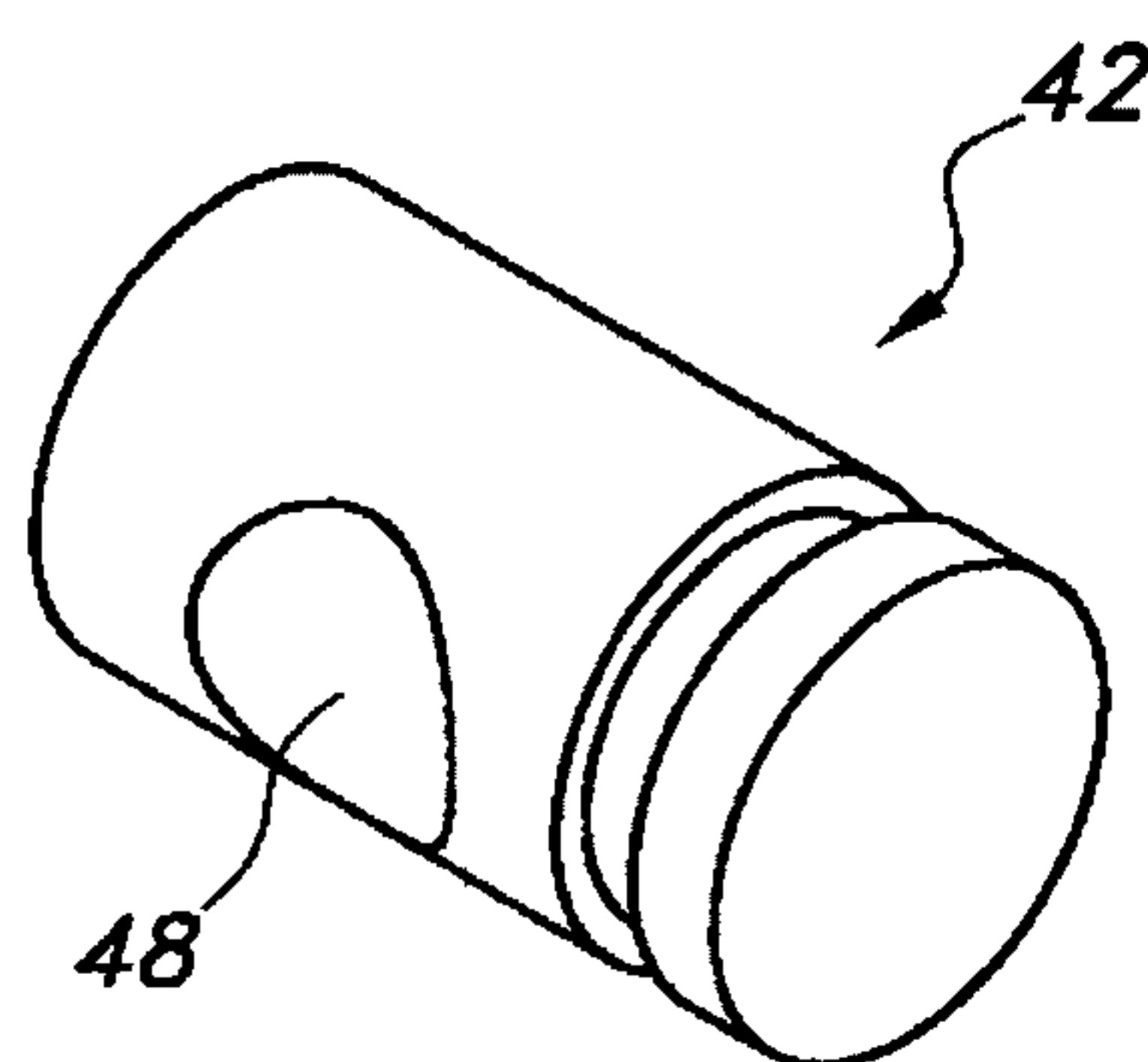


FIG. 18

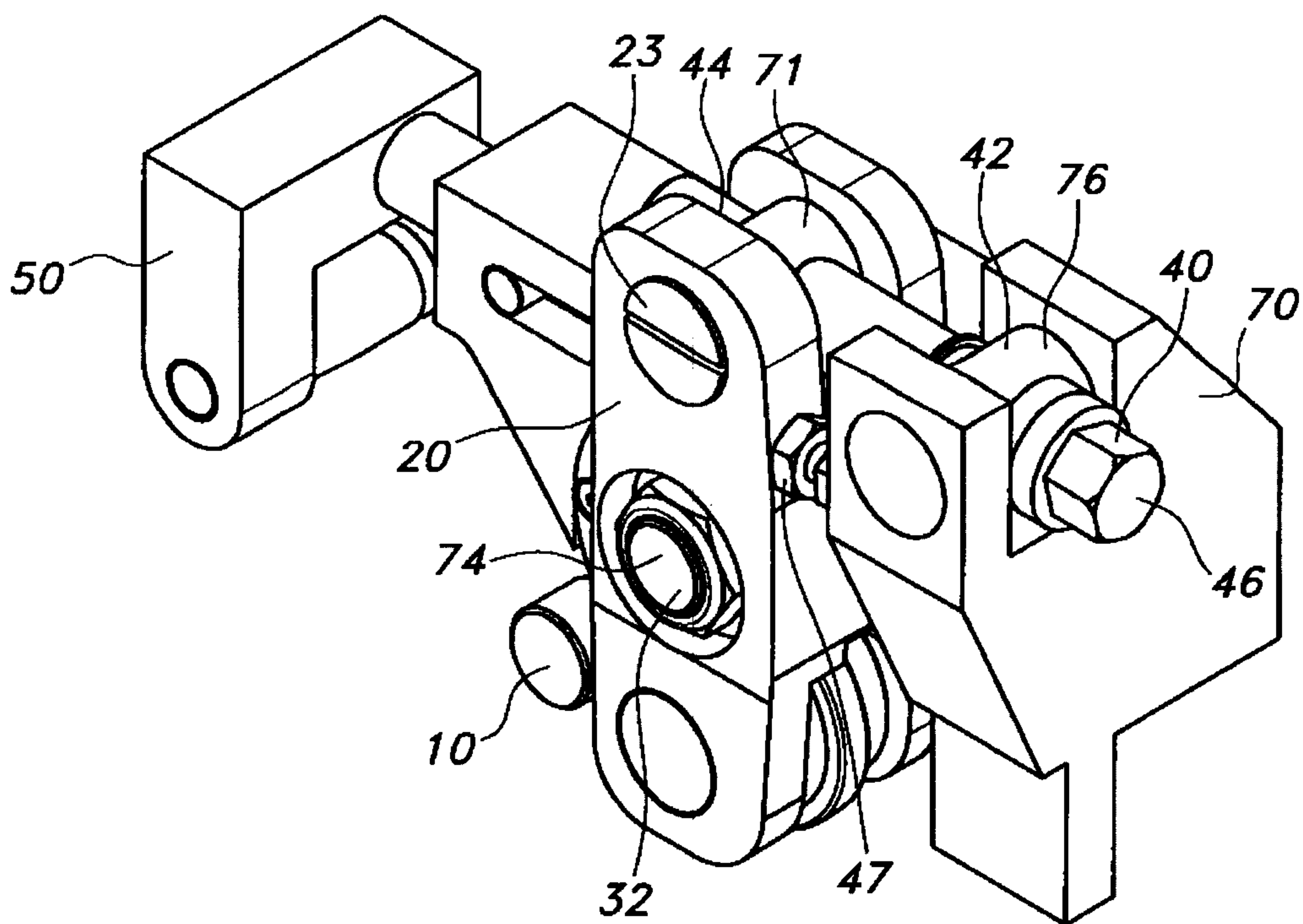


FIG. 19

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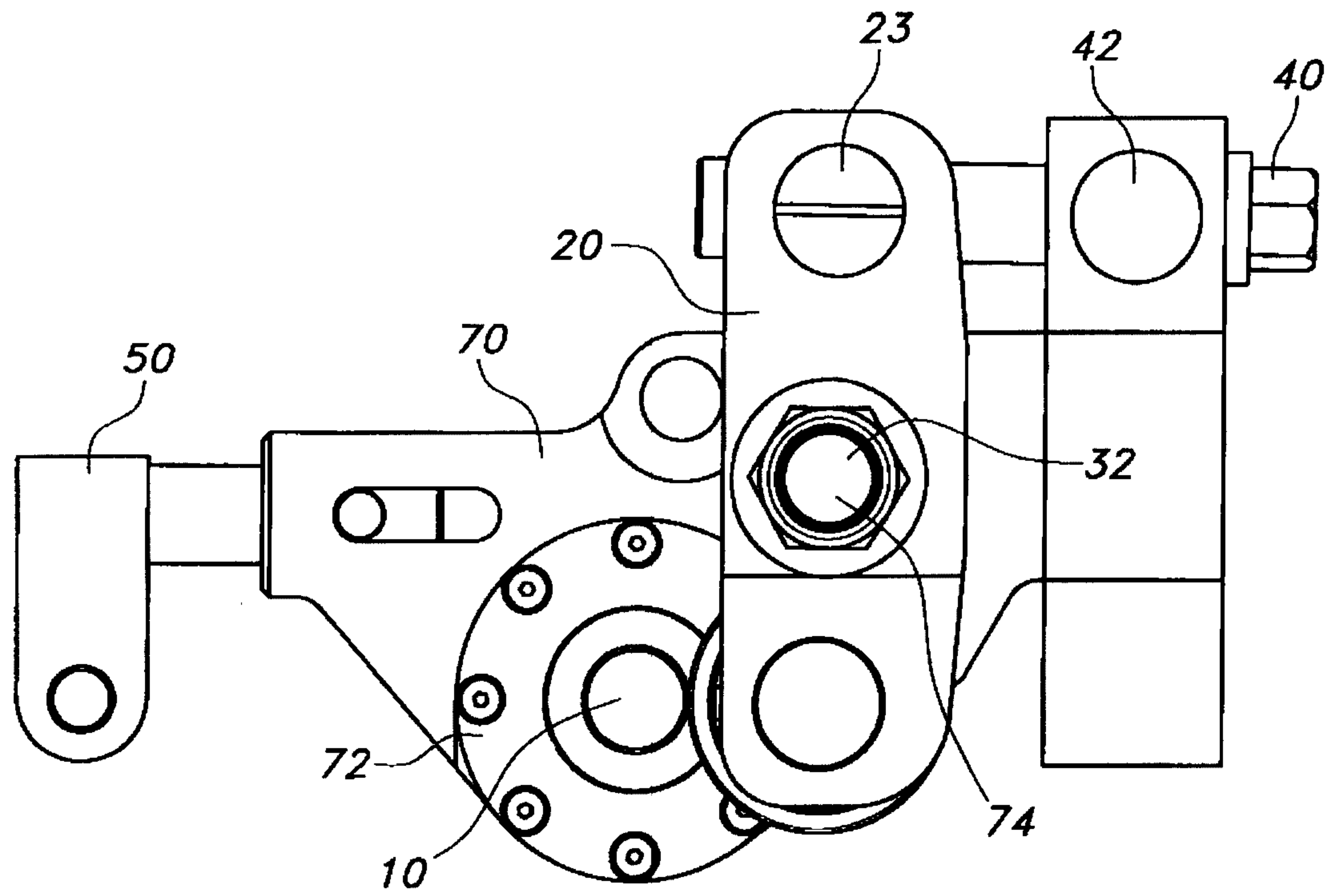


FIG. 20

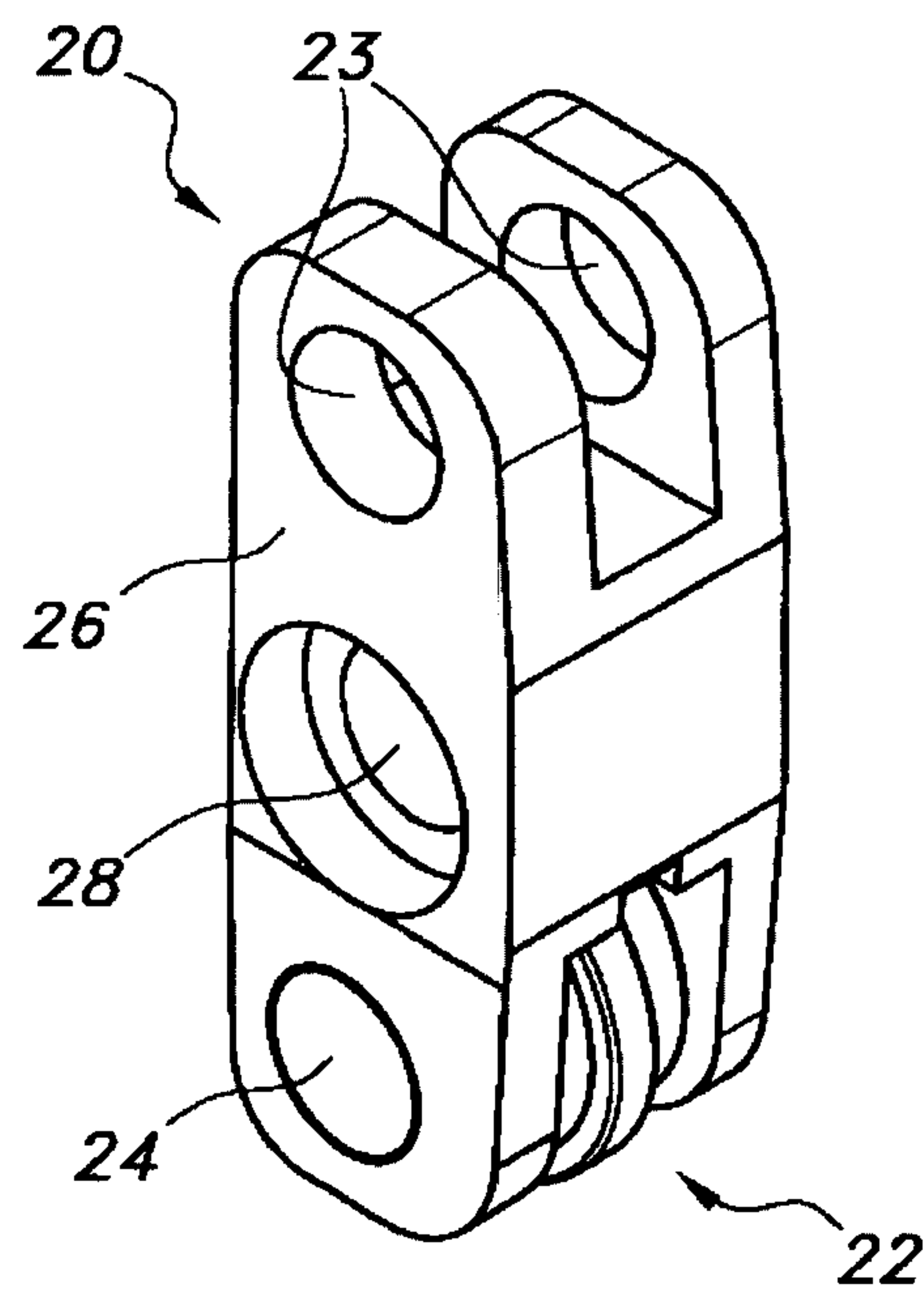


FIG. 21

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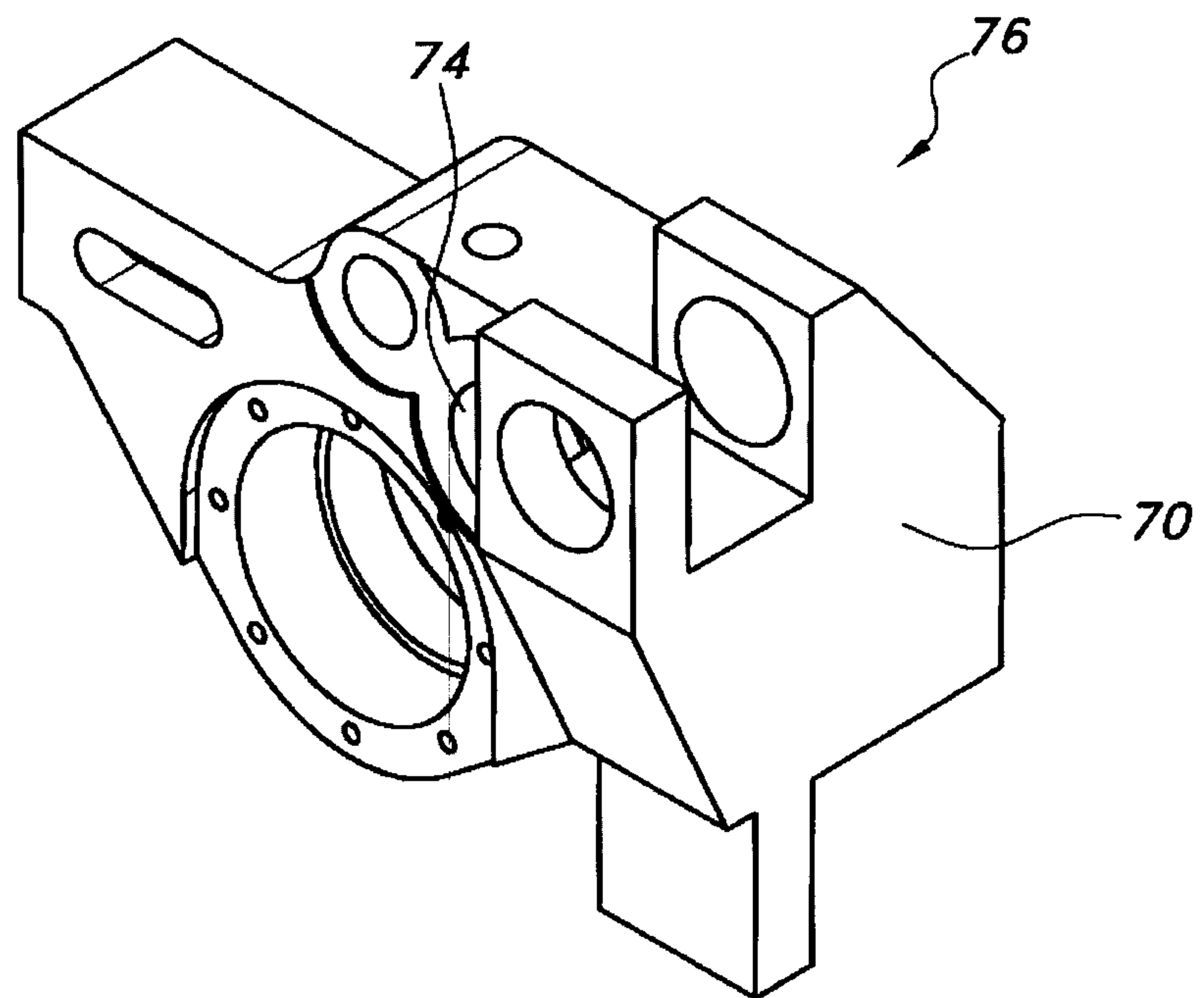


FIG. 22

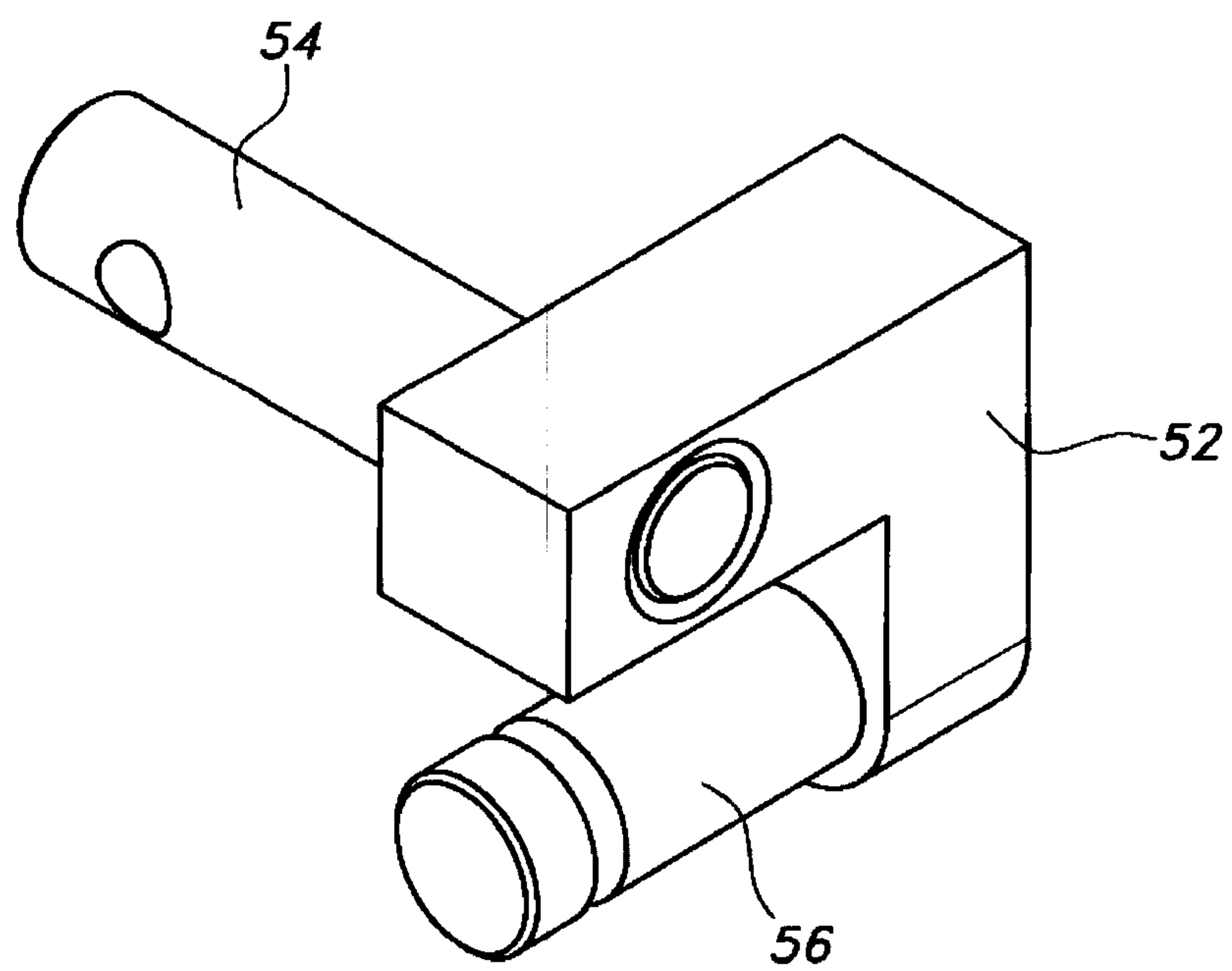


FIG. 23

