Office de la Propriété Intellectuelle du Canada
Un organisme d'Industrie Canada

Canadian Intellectual Property Office
An agency of Industry Canada

CA 2288512 C 2005/08/16

(11)(21) 2 288 512

(12) BREVET CANADIEN
CANADIAN PATENT

(13) C

(22) Date de dépôt/Filing Date: 1999/11/05

(41) Mise à la disp. pub./Open to Public Insp.: 2000/05/06

(45) Date de délivrance/Issue Date: 2005/08/16

(30) Priorité/Priority: 1998/11/06 (09/187,893) US

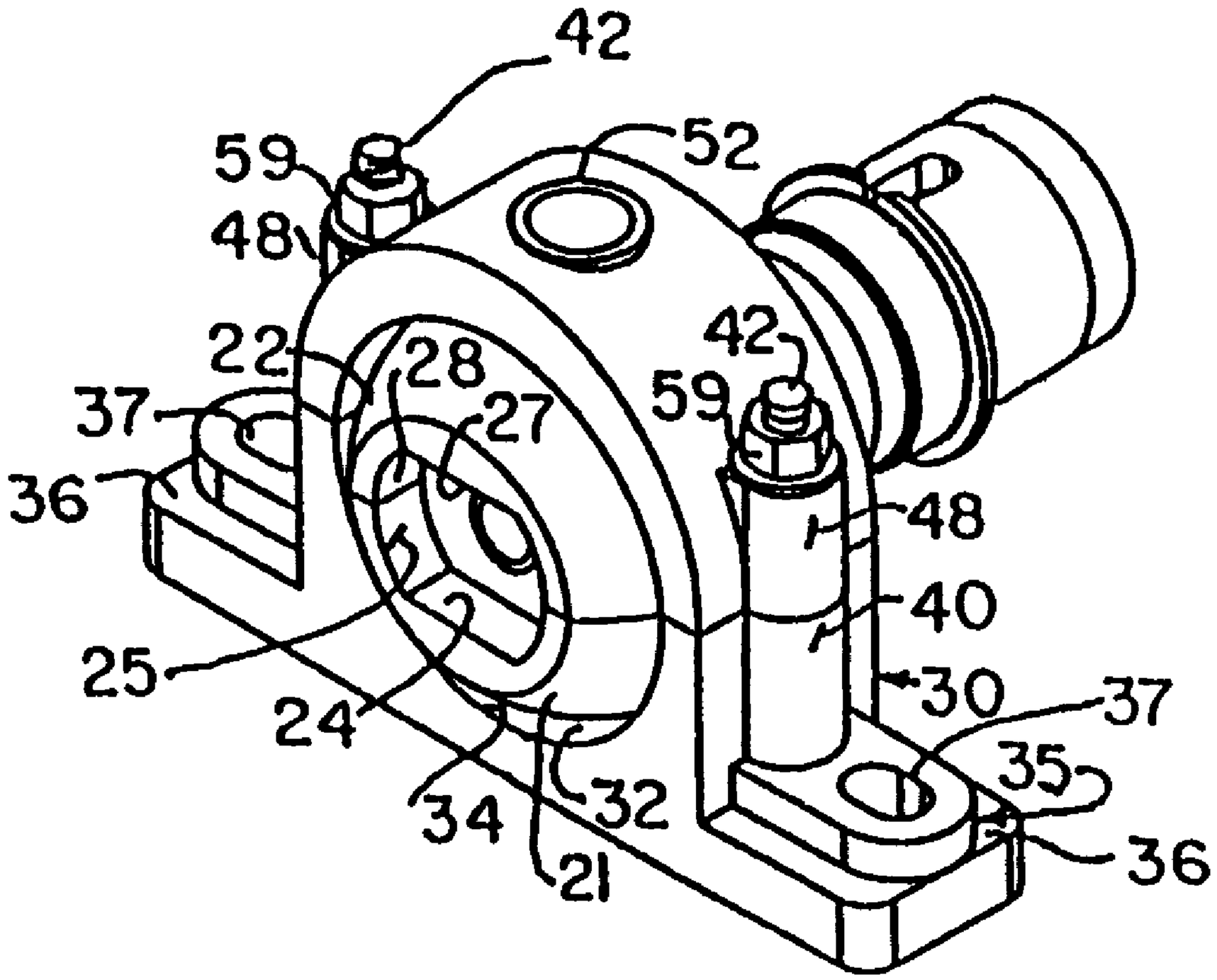
(51) Cl.Int.^{6}/Int.Cl.^{6} B65G 23/08, B65G 39/02

(72) Inventeurs/Inventors:
BOND, STEPHEN E., JR., US;
SIMONELLI, JAMES K., US

(73) Propriétaire/Owner:
EMERSON ELECTRIC CO., US

(74) Agent: BORDEN LADNER GERVAIS LLP

(54) Titre : BLOC DE FIXATION PIVOTANT POUR POULIES DE TRANSPORT MOTORISEES
(54) Title: PIVOTING MOUNTING BLOCK FOR MOTORIZED CONVEYOR PULLEYS



(57) Abrégé/Abstract:
In a motorized conveyor pulley in which an electric motor is mounted inside a cylindrical drum, the drum being mounted for rotation about an axis of rotation on shafts mounted against rotation, at least one shaft is mounted in a pivot sphere, the sphere is mounted in a complementary socketed block against rotation around the axis of rotation but to permit angular movement in response to misalignment of the shaft from one of the drum to the other end.

ABSTRACT OF THE DISCLOSURE

In a motorized conveyor pulley in which an electric motor is mounted inside a cylindrical drum, the drum being mounted for rotation about an axis of rotation on shafts mounted against rotation, at least one shaft is mounted in a pivot sphere, the sphere is mounted in a complementary socketed block against rotation around the axis of rotation but to permit angular movement in response to misalignment of the shaft from one of the drum to the other end.

PIVOTING MOUNTING BLOCK FOR MOTORIZED CONVEYOR PULLEYS

BACKGROUND OF THE INVENTION

Motorized conveyor pulley have an electric motor inside a drum of the pulley, and shafts, fixed against rotation, mounted on a conveyer frame. Conveyer frames are welded structures that inherently do not have the positional accuracy required to mount machine components. Machining the frame structure to create a proper alignment is expensive and many conveyor structures are too large to be machined. Even if they were machined, the frames, generally, are not rigid enough to prevent deflection in service, causing misalignment. In a motorized conveyor pulley a rigid mounting will cause excessive stress and lead to early failure of either the pulley or the frame. Thus, there must be a flexible connection to allow misalignment.

Conventionally, the shafts of a motorized conveyor pulleys are loosely fitted in yokes or mounting blocks to allow for misalignment. Such a loose fit is noisy and leads to wear due to relative motion and impact loading. This is likely to cause early failure. For food and beverage service, the gap between the shaft and the mounting block can trap food.

One of the objects of this invention is to provide a mounting structure for a motorized conveyor pulley that permits misalignment but at the same time minimizes noise and relative motion, and provides a more sanitary arrangement for food and beverage service installations.

Other objects will become apparent to those skilled in the art in the light of the following description and accompanying drawings.

BRIEF SUMMARY OF THE INVENTION

In accordance with this invention, generally stated, a mounting for a motorized conveyor pulley is provided in which at least one shaft of the pulley is mounted in a pivot sphere, the sphere being mounted in a complementarily socketed block against rotation around the axis of rotation of the shaft, but to permit angular movement in response to misalignment of the shaft from one end of the drum to another end. Preferably, in a drum having a shaft projecting from each end, each of the shafts is mounted against rotation in a sphere. The sphere can be held against rotation around the axis of the shaft by clamping of the mounting block around the sphere, or, positively, as by the provision of a pin in a slot cut axially in the outer surface of the sphere or in a cavity formed in the outer surface of the sphere, or by both the clamping and the pin.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

In the drawings, Figure 1 is a view in side elevation of a motorized conveyor pulley mounted in accordance with one illustrative embodiment of this invention. The shafts 5 and 6 are shown as exaggeratedly misaligned in a vertical plane, to illustrate the capability of the mounting assembly in this invention.;

Figure 2 is a sectional view of a prior art mounting block and shaft;

Figure 3 is a fragmentary sectional view of the shaft, sphere and mounting block shown on the right end of the pulley of Figure 1;

Figure 4 is a view in perspective of the mounting block and sphere and shaft of this embodiment of the invention;

Figure 5 is a view in end elevation of the block shown in Figure 4; and

Figure 6 is a view in end elevation of the block shown in Figure 2, being part of the prior art.

Corresponding reference numerals will be used throughout the several figures of the drawings.

DETAILED DESCRIPTION OF THE INVENTIION

Referring now to the drawings for one illustrative embodiment of this invention, reference numeral 1 indicates a motorized conveyor pulley, which can be conventional as described in co-pending Canadian application no. 2,288,502 filed concurrently herewith and assigned to a common assignee. The pulley 1 is bolted to a support structure 2, shown only fragmentarily. The pulley includes a drum 3 and two shafts, 5 and 6, cylindrical through their central section, but provided at their projecting ends with flats 7.

Figures 2 and 6 illustrate a conventional mounting, in which a shaft 5 is loosely confined in a mounting block or a yoke 9, within a slot defined by side walls 10 and a bottom wall 11, which permits vertical misalignment, and a limited amount of horizontal angular misalignment, but suffers from the disadvantages described heretofore.

In the present invention the shafts 5 and 6 are mounted against rotation in spheres 20. The spheres 20 are made in the form of two hemispheres, a lower hemisphere 21 and an upper hemisphere 22. The upper hemisphere 22 has, in this embodiment, an axial channel 23 in its uppermost surface, defined by parallel side walls and a bottom wall, as shown in Figure 3.

Each of the shafts 5 and 6 is mounted in a seat defined by a flat bottom 24 and arcuate side walls 25 in the lower hemisphere and a flat upper wall 27 and arcuate side walls 28 in the upper hemisphere. The spheres are mounted in mounting blocks 30, and seated in sockets 32 formed in the mounting blocks 30. The mounting blocks 30 are made in two parts, a lower seat part 34 and an upper seat part 46. The lower seat part 34 has a base 35 from which ears 36 extend. Ears 36 have bolt holes 37 through them by which the mounting blocks are mounted on the support structure. The base 35 has bolt bosses 40, from which bolts 42, parallel to one another, project toward the upper seat part. The seats of the socket 32 are in the form of a semicircular groove or channel 44 in the lower seat part and 50 in the upper seat part 46. The grooves 44 and 50 are aligned, to form a continuous annular seat when the parts 34 and 46 are mounted.

The upper seat part 46 has bolt bosses 48 through which the bolts 42 extend, projecting from an upper surface of the bolt bosses sufficiently far to receive nuts 59. An internally threaded bolt hole 52, extending radially through the upper seat 46, is aligned with the channel 23. A threaded pin 54, mounted in the bolt hole 52, extends into the channel 23, closely adjacent but clear of the upper suface of the bottom wall of the channel, so as to permit angular movement of the shafts in a vertical plane, and is provided with sufficient clearance between the side walls of the channel 23 to permit angular movement of the ball or sphere 20 about the pin 54 as a pivot in a horizontal plane. Thus the axis of rotation of the drum has freedom to pitch and yaw, but not to translate or roll.

In this embodiment, tightening the nuts 59 on the bolts 42 clamps the sphere between the upper and lower seat members 34 and 46. The sphere can be prevented from rotating

around the axis of the shaft either by the clamping pressure or by the provision of the pin 54, or both.

The clamping pressure can be sufficient to prevent rotation of the sphere in response to the tendency of the shafts to rotate, but not enough to forestall angular movement in response to the large torque forces resulting from movement of one side of the support structure with respect to the other. The pin provides a positive restraint against rotation.

Numerous variations in the construction of the mounting assembly of this invention, within the scope of the appended claims, will occur to those skilled in the art in the light of the foregoing disclosure. For example, although the present arrangement is preferred, the sphere and socket mounting can be applied to only one end of the shaft if a single shaft is employed, or to one of the shafts. A boss or pin in the outer surface of the sphere can be seated in a well or channel in the socket seat. An axial boss or bar or pin carried by the mounting block can be directed through an hourglass - shaped channel in the sphere or vice versa. The ends of the shafts can be differently formed, as, for example, polygonally instead of with flats. The socket can be made to enclose the sphere more completely, and the open end of the seat in which the shaft end is mounted can be closed, for food conveyor applications, although the construction shown is an improvement over the prior art in that respect. These are merely illustrative.

CLAIMS:

1. A motorized conveyer pulley having an electric motor mounted inside a cylindrical drum, said drum being mounted for rotation about a substantially fixed axis of rotation on at least one shaft mounted against rotation, said at least one shaft being mounted in a pivot sphere, and means for mounting said sphere in a complementarily socketed block, said mounting means restraining said sphere against rotation around said substantially fixed axis of rotation, but permitting angular movement in response to misalignment of said shaft in fixedly mounting the socketed block to a support structure.

2. The motorized conveyer pulley of claim 1, wherein the drum is mounted on two shafts, one projecting from each end of said drum, both said shafts being mounted against rotation in pivot spheres, both said spheres being mounted exteriorly of said drum in complementarily socketed blocks against rotation around said axis of rotation.

3. The motorized conveyer pulley of claim 1 wherein said mounting means includes means for frictionally restraining said sphere from rotation about said axis of rotation.

4. The motorized conveyer pulley of claim 1 wherein said mounting means includes means for positively restraining said sphere from rotation about said axis of rotation.

5. The motorized conveyer pulley of claim 1 wherein said mounting means includes means for both frictionally and positively restraining said sphere from rotation about said axis of rotation.

6. The motorized conveyer pulley of claim 2 wherein said mounting means includes means for frictionally restraining said spheres from rotation about said axis of rotation.

7. The motorized conveyer pulley of claim 2 wherein said mounting means includes means for positively restraining said spheres from rotation about said axis of rotation.

8. The motorized conveyer pulley of claim 2 wherein said mounting means includes means for both frictionally and positively restraining said spheres from rotation about said axis of rotation.

9. The motorized conveyer pulley of claim 4 wherein said means for positively restraining said sphere comprise an axially directed channel in an outer surface of said sphere, said channel being defined by chordally extending walls and a bottom wall, and a pin carried by said block and extending within the compass of said channel between and closely adjacent said walls.

10. The motorized conveyer pulley of claim 7 wherein said means for positively restraining said spheres comprise an axially directed channel in an outer surface of each said sphere, said channel being defined by chordally extending walls and a bottom wall, and a pin carried by said block and extending within the compass of said channel between and closely adjacent said walls.

11. A method of making and installing a motorized conveyer pulley in which an electric motor is mounted inside a cylindrical drum, comprising mounting said drum for rotation about a substantially fixed axis of rotation on at least one shaft mounted against rotation, mounting an end of said shaft against rotation about said axis of rotation in a pivot sphere, loosely mounting on a support structure for said pulley a mounting block having a socket formed complementarily to said pivot sphere, loosely mounting said pivot sphere in said mounting block, aligning said pulley and thereafter fixedly mounting said mounting block on said supporting structure and restraining said sphere against rotation in said mounting block.

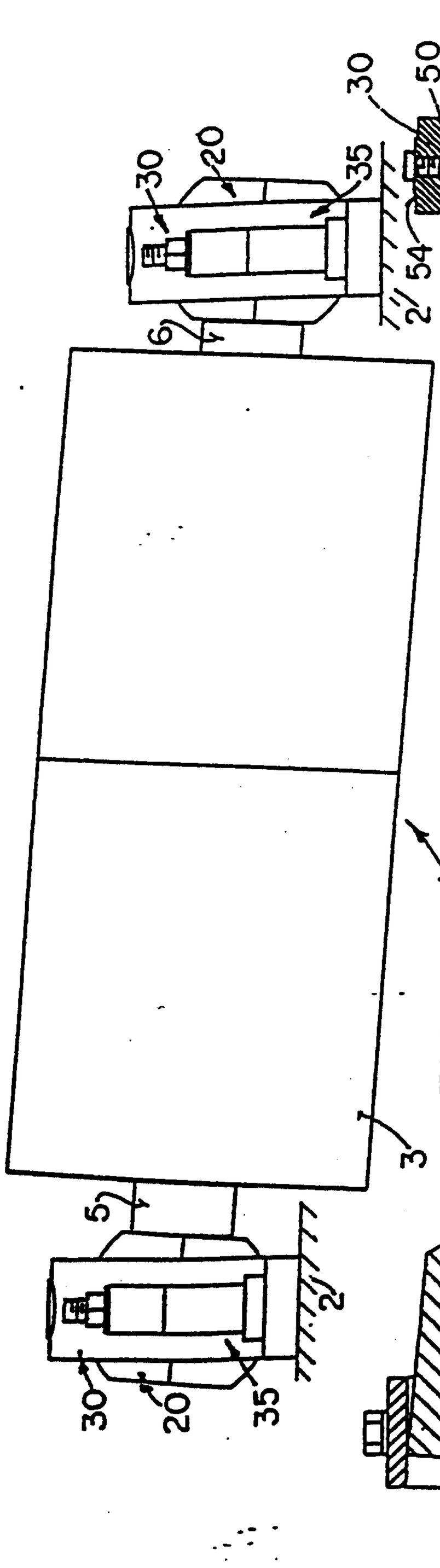


FIG.1

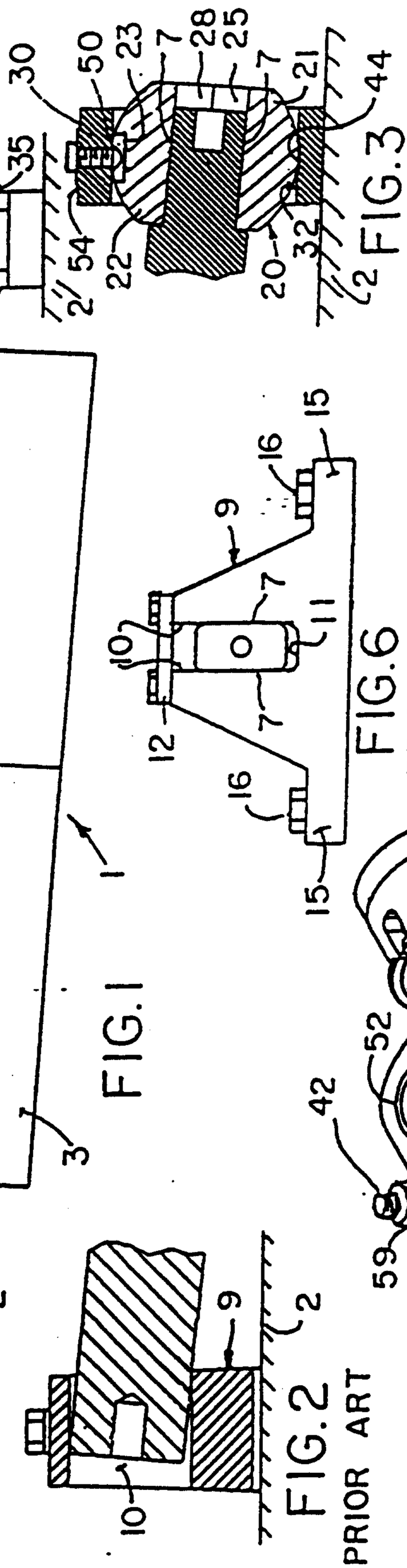


FIG.3

FIG.6
PRIOR ART

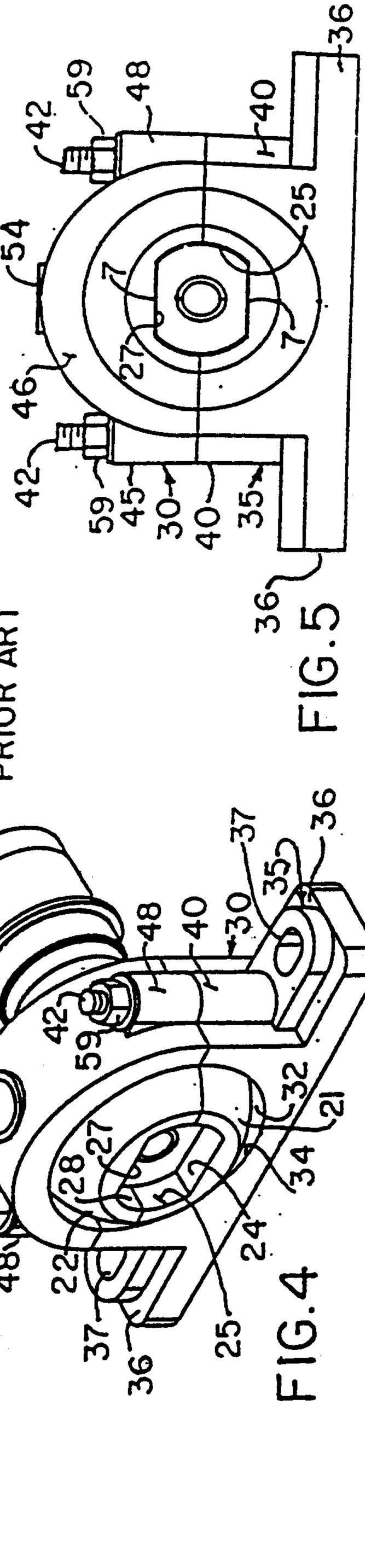
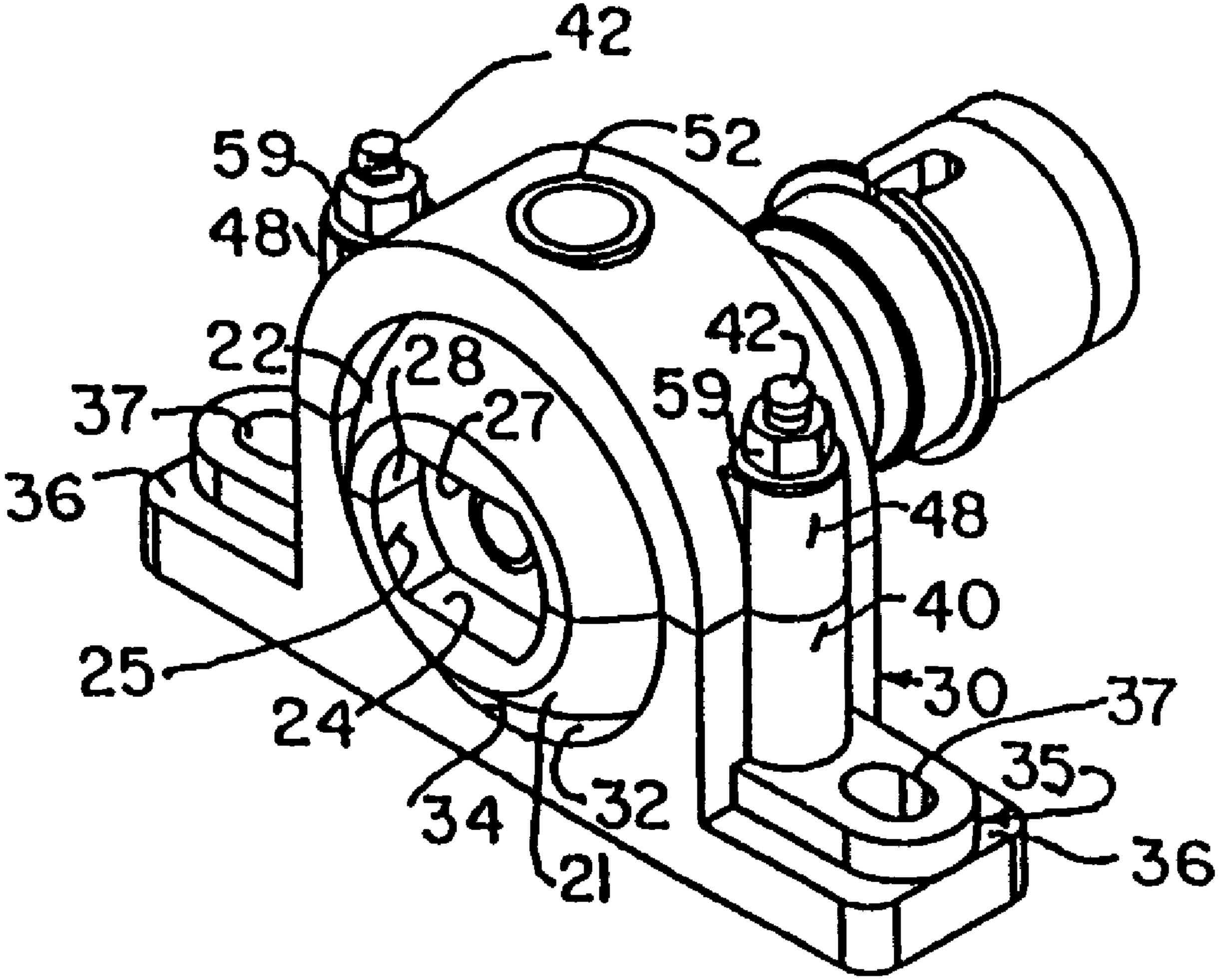


FIG.5

FIG.4

FIG.2
PRIOR ART


42
59
52
48
22
28
42
37
27
59
36
48
40
25
30
37
24
35
34
32
36
21