

①⑫ **EUROPEAN PATENT SPECIFICATION**

- ④⑤ Date of publication of patent specification: **21.08.85** ⑤① Int. Cl.⁴: **E 02 F 3/358**
②① Application number: **80902136.3**
②② Date of filing: **13.03.80**
③⑧ International application number:
PCT/US80/00266
③⑦ International publication number:
WO 81/02596 17.09.81 Gazette 81/22

⑤④ **SWING MOTOR MOUNTING ARRANGEMENT.**

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| ④③ Date of publication of application:
17.03.82 Bulletin 82/11 | ⑦③ Proprietor: CATERPILLAR TRACTOR CO.
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| ⑤⑧ References cited:
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Description

Technical Field

This invention relates generally to a swing motor mounting arrangement and more particularly to a swing motor connected between a vehicle frame and a mast frame for selectively swinging the mast frame relative to the vehicle frame.

Background Art

Construction vehicles, such as backhoes, include a swing motor mounted between a tractor frame and a mast frame for selectively swinging a boom attached to the mast frame to various work positions. It has proven desirable to provide a mounting arrangement for the swing motor whereby the motor may be expeditiously installed and removed for repair or replacement purposes. In addition, the mounting arrangement should exhibit sufficient structural integrity to prevent undue wear of component parts thereof, such as spline connections, pins, and bearings. Swing motor mounting arrangements of this type are disclosed in U.S. Patent No. 3,758,941, issued to James S. Jackson et al. on September 18, 1973. In these arrangements, however, the motor drive is transmitted to the mast frame through components forming part of the bearings pivotally mounting the mast frame on the tractor frame.

Disclosure of Invention

In one aspect of the present invention, a swing motor mounting arrangement is provided which is in accordance with claim 1.

The swing motor mounting arrangement is such that the drive coupling to the second mast frame is isolated from the pivotal mounting of the mast frame and is thus adapted for expeditious assembly and disassembly for repair or replacement purposes. In addition, the first and second bracket means provide a structurally integrated arrangement for protecting various spline connections, pins, and bearings of the mounting arrangement against undue wear to prolong the service life thereof.

In another aspect, the invention relates to a backhoe swing motor mounting arrangement in accordance with claim 6.

Brief Description of Drawings

Other advantages and objects of this invention will become apparent from the following description and accompanying drawings wherein;

Figure 1 is a side elevational view of a swing motor mounting arrangement constituting an exemplary embodiment of the present invention;

Figure 2 is a top plan view of the mounting arrangement, taken in the direction of arrows II—II in Figure 1; and

Figures 3 is an enlarged sectional view of a spline connection of the mounting arrangement, taken in the direction of arrows III—III in Figure 1.

Figure 1 illustrates a swing motor mounting arrangement 10 comprising a swing motor 11

having a housing 12 and a shaft 13 rotatably mounted in the housing. Opposite ends 14 of shaft 13 project beyond housing 12 in exposed relationship and are secured to a mast frame 15 in a manner hereinafter described. Motor housing 12 is secured to a frame 16 of a tractor or the like by a connection 17 and mast frame 15 is pivotally mounted on tractor frame 16 whereby rotation of shaft 13 relative to housing 12 will selectively swing mast frame 15 horizontally relative to tractor frame 16 to various work positions.

Mast frame 15 has a boom 18 pivotally mounted thereon, along with a rod 19 of a double-acting hydraulic cylinder connected to a dipper stick (not shown) pivotally mounted on the boom. Swing motor 11 has at least one vane (not shown) secured on shaft 13 to selectively rotate the shaft relative to housing 12 in response to communication of pressurized hydraulic fluid therein.

A pair of vertically spaced first bracket means 20, similar in construction and arrangement, pivotally mount mast frame 15 on tractor frame 16 and provide a highly structurally integrated connection therebetween. As shown in Figures 1 and 2, each bracket means 20 includes a bifurcated bracket 21 secured on mast frame 15 to extend rearwardly therefrom, a single bracket 22 secured on tractor frame 16 to extend rearwardly therefrom, and pivot pin 23. Pivot pin 23 is suitably secured to bracket 21 by a bolt 24 extending through an upper arm of bracket 21 and pivot pin 23. Pivot pin 23 is further mounted in an annular bearing 25 to facilitate relative pivoting between frames 15 and 16 and is aligned vertically with respect to shaft 13 and the other pivot pin 23.

Referring to Figures 1 and 3, opposite ends 14 of motor shaft 13 are secured to mast frame 15 by a pair of vertically spaced second bracket means 26. Each bracket means 26 includes a bracket 27 secured to mast frame 15 to extend rearwardly therefrom and a plate 28, shown in the form of a cap, releasably secured to bracket 27 by fastening means shown in the form of a pair of bolts 29. If so desired, a tubular centering dowel 30 may be inserted between bracket 27 and plate 28 to aid in the securance of each bolt 29 to bracket 27, as shown in Figure 3.

Each plate 28 has spline teeth 31 formed there-through to engage similar spline teeth 32 formed on a respective end 14 of motor shaft 13. It can be seen in Figures 1 and 2 that expeditious and precise mounting of motor 11 on mast frame 15 is facilitated by allowing plates 28 to be initially secured to the ends of motor shaft 13 at splines 31, 32 and by thereafter securing the plates to brackets 27 by bolts 29. Subsequently, brackets 22 of tractor frame 16 may be properly positioned within bifurcated brackets 21 of mast frame 15 to permit pivot pins 23 to be secured in place by bolts 24 and also to permit attachment of motor housing 12 to tractor frame 16 by connection 17. As further shown in Figure 1, aligned bores 33 and 34 may be formed through brackets 21 and 22, respectively, to releasably receive a swing lock

pin 35 therein to lock mast frame 15 against swinging movements relative to tractor frame 16 during roading of the vehicle, for example.

Industrial Applicability

Swing motor mounting arrangement 10 finds particular application to backhoes which include mast frame 15, adapted for swinging movements on tractor frame 16 in response to actuation of swing motor 11. Although frame 16 has been referred to as a "tractor frame", it should be understood that in many backhoe applications frame 16 would constitute a mounting frame slidably mounted for lateral movements on a tractor frame proper to permit selective positioning and locking of mast frame 15 at a desired lateral position at the rearward end of the tractor.

In operation, an operator desiring to swing mast frame 15 relative to tractor frame 16 would actuate the proper control lever (not shown) to communicate pressurized hydraulic fluid to motor 11. Since motor housing 12 is secured to tractor frame 16 at connection 17, motor shaft 13 will rotate relative to housing 12 to effect such swinging movement of mast frame 15. It should be particularly noted that the vertically spaced bracket means 20 will function to support the weight of mast frame 15 and its attendant components, such as boom 18 and the dipper stick and bucket, to ensure that spline connections 31, 32 and motor 11 proper will remain in a stress-relieved condition of operation. Otherwise stated, the primary function of the spline connections is to pivot mast frame 15 on tractor frame 16, and no adverse loads are imposed thereon during operation of the backhoe since such loads will be absorbed by the heavy-duty bracket means 20.

Other aspects, objects, and advantages of this invention can be obtained from a study of the drawings, the disclosure, and the appended claims.

Claims

1. A swing motor mounting arrangement (10) having a motor (11) including a housing (12) and a shaft (13) rotatably mounted in said housing (12), opposite ends (14) of said shaft (13) being exposed at opposite ends of said housing 12, a first frame (16) having said housing (12) secured thereto, and a second frame (15) pivotally mounted on said first frame (16) and non-rotatably coupled to the ends of said shaft, said second frame having a pair of spaced first bracket means (20) pivotally mounting said second frame (15) on said first frame (16), characterised in that said second frame (15) has a pair of spaced second bracket means (26) coupling the opposite ends (14) of said shaft (13) to said second frame (15), whereby said pivotal mounting is isolated from said shaft coupling.

2. The swing motor mounting arrangement (10) of claim 1 wherein said first frame includes a tractor frame (16) and wherein said second frame

includes a mast frame (15) having a boom (18) pivotally mounted therein.

3. The swing motor mounting arrangement (10) of claims 1 or 2 wherein each of said first bracket means (20) includes a bifurcated bracket (21) secured to said second frame (15) to extend rearwardly therefrom, a single bracket (22) secured to said first frame (16) to extend rearwardly therefrom and within said bifurcated bracket (21), and a pivot pin (23) pivotally connecting said bifurcated bracket (21) and said single bracket (22) together, the pivot pins (23) of said pair of first bracket means (20) being aligned vertically with each other and with said shaft (13).

4. The swing motor mounting arrangement (10) of claim 1, 2 or 3 wherein each of said second bracket means (26) includes a bracket (27) secured to said second frame (15) to extend rearwardly therefrom, a plate (28) having a respective end (14) of said shaft (13) secured thereto, and fastening means (29) for releasably securing said plate (28) to said bracket (27).

5. The swing motor mounting arrangement (10) of claim 4 wherein each end (14) of said shaft (13) is releasably secured to the respective plate (28) at a spline connection (31, 32).

6. A backhoe swing motor mounting arrangement (10) having a mast frame (15), a tractor frame (16), a pair of first brackets (21) secured to one (15) of said frames, a pair of second brackets (22) secured to the other (16) of said frames and extending in overlapping relationship with said first brackets (21), a pivot pin (23) extending between each first bracket (21) and a respective second bracket (22) to provide a pivotal connection therebetween, and a swing motor (11) having a housing (12) connected to said tractor frame (16) and having a shaft (13) aligned with said pivot pins (23) and being rotatably mounted in said housing (12), the ends of the shaft being non-rotatably coupled to said mast frame to provide a drive connection, characterized by a pair of third brackets (27) which is secured to said mast frame (15) and positively coupled to the opposite ends of said shaft (13) to provide said drive connection, whereby said pivotal connection and said drive connection are isolated from one another.

Patentansprüche

1. Eine Schwenkmotor-Befestigungsanordnung (10) mit einem Motor (11) einschließlich einem Gehäuse (12) und einer drehbar in dem Gehäuse (12) gelagerten Welle (13), wobei entgegengesetzt liegende Enden (14) der Welle (13) an entgegengesetzten Enden des Gehäuses (12) frei liegen, und wobei ferner das Gehäuse (12) an einem ersten Rahmen (16) befestigt ist und ein zweiter Rahmen (15) schwenkbar am ersten Rahmen (16) gelagert ist und nicht drehbar mit den Enden der erwähnten Welle (13) gekuppelt ist, wobei der zweite Rahmen (15) ein Paar von mit Abstand angeordneten ersten Bügelmitteln (20) aufweist zur schwenkbaren Lagerung des zweiten Rahmens (15) auf dem ersten Rahmen (16), dadurch

gekennzeichnet, daß der zweite Rahmen (15) eine Paar von mit Abstand angeordneten zweiten Bügelmitteln (26) aufweist zum Kuppeln der entgegengesetzt liegenden Enden (14) der Welle (13) mit dem zweiten Rahmen (15), wodurch die Schwenkbewegung gegenüber der Wellenkuppelung isoliert ist.

2. Schwenkmotor-Befestigungsanordnung (10) nach Anspruch 1, wobei der erste Rahmen einen Traktorrahmen (16) aufweist, und wobei der zweite Rahmen einen Mastrahmen (15) besitzt mit einem Ausleger (18) schwenkbar daran befestigt.

3. Schwenkmotor-Befestigungsanordnung (10) nach Anspruch 1 oder 2, wobei jedes der ersten Bügelmittel (20) einen zweigabeligen Bügel (21) befestigt an dem zweiten Rahmen (15) aufweist und zwar sich nach hinten von dort aus erstreckend, und wobei ein einziger Bügel (22) an dem ersten Rahmen (16) befestigt ist, um sich von dort aus nach hinten und innerhalb des zweigabeligen Bügels (21) zu erstrecken, und wobei ein Schwenkzapfen (23) schwenkbar den zweigabeligen Bügel (21) mit dem einzigen Bügel (22) verbindet, und wobei die Schwenkzapfen (23) des erwähnten Paares von ersten Bügelmitteln (20) vertikal miteinander und mit der Welle (13) ausgerichtet sind.

4. Schwenkmotor-Befestigungsanordnung (10) nach Anspruch 1, 2 oder 3 wobei jedes der zweiten Bügelmittel (26) einen Bügel (27) befestigt am zweiten Rahmen (15) und sich nach hinten von dort aus erstreckend aufweist, und wobei eine Platte (28) ein entsprechendes Ende (14) der Welle (13) daran befestigt besitzt, und wobei ferner Befestigungsmittel (29) zur lösbaren Befestigung der Platte (28) an dem Bügel (27) dienen.

5. Schwenkmotor-Befestigungsanordnung (10) nach Anspruch 4, wobei jedes Ende (14) der Welle (13) lösbar an der entsprechenden Platte (28) an einer Keilnutverbindung (31, 32) befestigt ist.

6. Bagger-Schwenkmotor-Befestigungsanordnung (10) mit einem Mastrahmen (15), einem Traktorrahmen (16), einem Paar von ersten Bügeln (21) befestigt an einem (15) der Rahmen, einem Paar von zweiten Bügeln (22) befestigt am anderen (16) der Rahmen und sich in einer überlappenden Beziehung mit den ersten Bügeln (21) erstreckend, einen Schwenkzapfen (23), der sich zwischen jedem ersten Bügel (21) und einem entsprechenden zweiten Bügel (22) erstreckt um eine Schwenkverbindung dazwischen vorzusehen, und ein Schwenkmotor (11) mit einem Gehäuse (12) befestigt am Traktorrahmen (16) und mit einer Welle (13) ausgerichtet mit den Schwenkzapfen (23) und drehbar gelagert in dem Gehäuse (12), wobei die Enden der Welle nicht drehbar mit dem Mastrahmen gekoppelt sind um eine Antriebsverbindung zur schaffen, gekennzeichnet durch ein Paar von dritten Bügeln (27), welches an dem Mastrahmen (15) befestigt ist und positiv mit den entgegengesetzten Enden der Welle (13) gekuppelt ist, um die Antriebsverbindung vorzusehen, wodurch die Schwenkverbindung und die Antriebsverbindung voneinander isoliert sind.

Revendications

1. Dispositif de montage (10) pour un moteur de pivotement comportant un moteur (11) comprenant un carter (12) et un arbre (13) monté à pivotement dans ledit carter (12), des extrémités opposées (14) dudit arbre (13) étant apparentes aux extrémités opposées dudit carter (12), un premier châssis (16) sur lequel est fixé ledit carter (12), et un second châssis (15) monté à pivotement sur ledit premier châssis (16) et accouplé de manière non pivotante aux extrémités dudit arbre, ledit second châssis possédant deux premiers organes de support (20) permettant de monter à pivotement ledit second châssis (15) sur ledit premier châssis (16), caractérisé en ce que ledit second châssis (15) comporte deux seconds organes de support (26) espacées accouplant les extrémités opposées (14) dudit arbre (13) avec ledit second châssis (15), ledit montage à pivotement étant isolé dudit accouplement d'arbre.

2. Dispositif de montage (10) pour un moteur de pivotement selon la revendication 1, dans lequel ledit premier châssis comprend un châssis de tracteur (16), et dans lequel ledit second châssis comprend un châssis de mât (15) comportant une flèche (18) montée à pivotement sur ce dernier.

3. Dispositif de montage (10) pour un moteur de pivotement selon la revendication 1 ou 2, dans lequel chacun desdits premiers organes de support (20) comprend un support bifurqué (21) fixé audit second châssis (15) de manière à s'étendre vers l'arrière de ce dernier, un support simple (22) fixé audit premier châssis (16) de manière à s'étendre vers l'arrière de ce dernier et à l'intérieure dudit support bifurqué (21), et un pivot (23) reliant à pivotement ledit support bifurqué (21) et ledit support simple (22) entre eux, le pivot (23) desdits deux premiers organes de support (20) étant alignés verticalement l'un par rapport à l'autre et par rapport audit arbre (13).

4. Dispositif de montage (10) pour un moteur de pivotement selon la revendication 1, 2 ou 3, dans lequel chacun desdits seconds organes de support (26) comprend un support (27) fixé audit second châssis (15) de manière à s'étendre vers l'arrière de ce dernier, une plaque (28) sur laquelle est fixée une extrémité respective (14) dudit arbre (13), et des organes de fixation (29) pour fixer de manière amovible ladite plaque (28) audit support (27).

5. Dispositif de montage (10) pour un moteur de pivotement selon la revendication 4, dans lequel chaque extrémité (14) dudit arbre (13) est fixée de manière amovible à la plaque (28) qui lui est associée, au moyen d'une liaison à cannelures (31, 32).

6. Dispositif de montage (10) pour un moteur de pivotement destiné à une pelle rétrocaveuse et comportant un châssis de mât (15), un châssis de tracteur (16), deux premiers supports (21) fixés à l'un (15) desdits châssis, deux seconds supports (22) fixés à l'autre (16) desdits châssis et s'étendant de façon chevauchante sur lesdits premiers supports (21), un pivot (23) s'étendant entre cha-

que premier support (21) et un second support (22) associé afin de procurer une liaison pivotante entre eux, et un moteur de pivotement (11) comportant un carter (12) relié audit châssis de tracteur (16) et comportant un arbre (13) aligné sur lesdits pivots (23) et monté à pivotement à l'intérieur dudit carter (12), les extrémités de l'arbre étant accouplés de manière non pivotante audit

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châssis de mât afin de procurer une liaison motrice, caractérisé par deux troisièmes supports (27) qui sont fixés audit châssis de mât (15) et accouplés positivement aux extrémités opposées dudit arbre (13) afin de procurer ladite liaison motrice, ladite liaison pivotante et ladite liaison motrice étant isolées l'une de l'autre.

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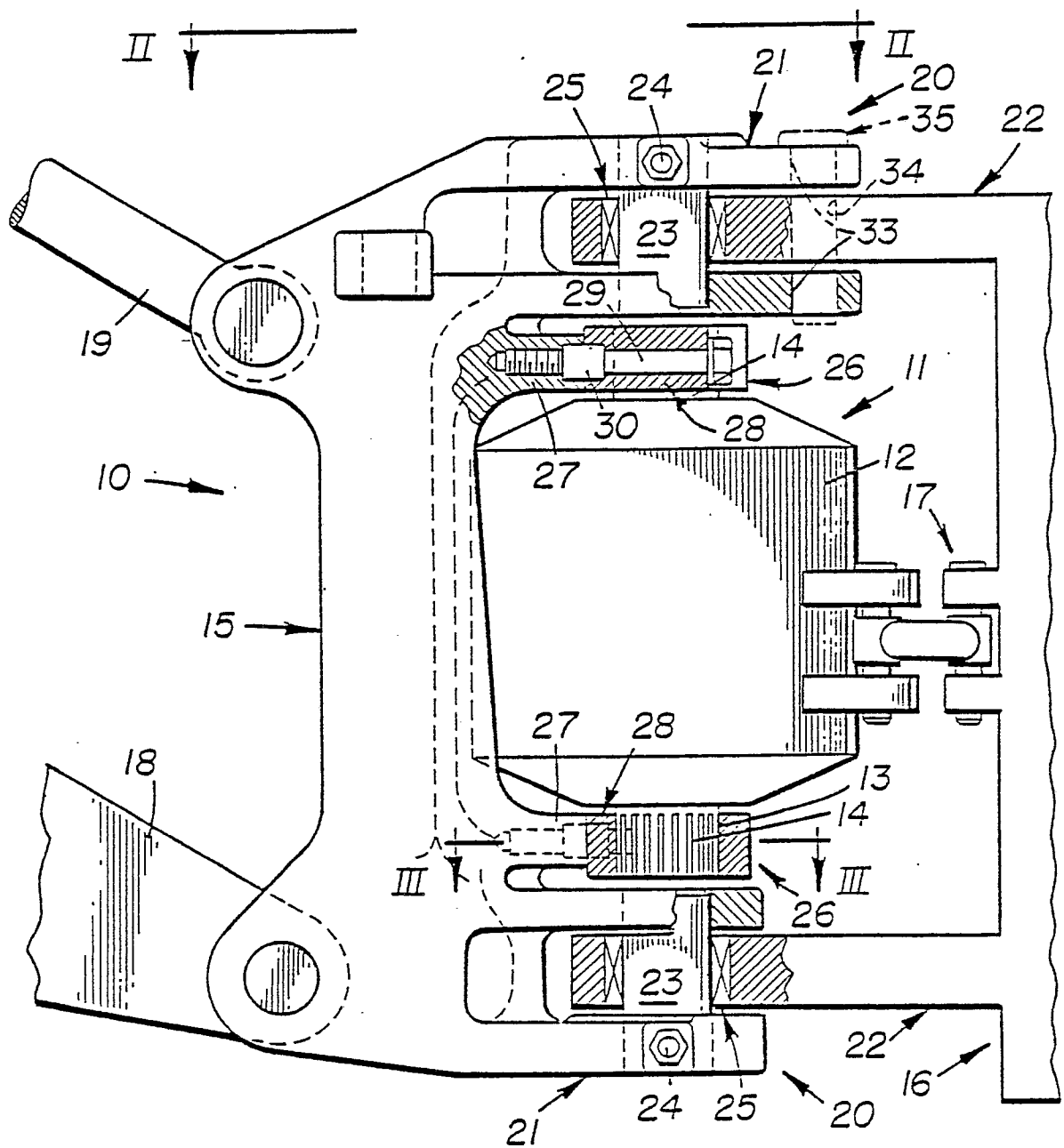


FIGURE 1

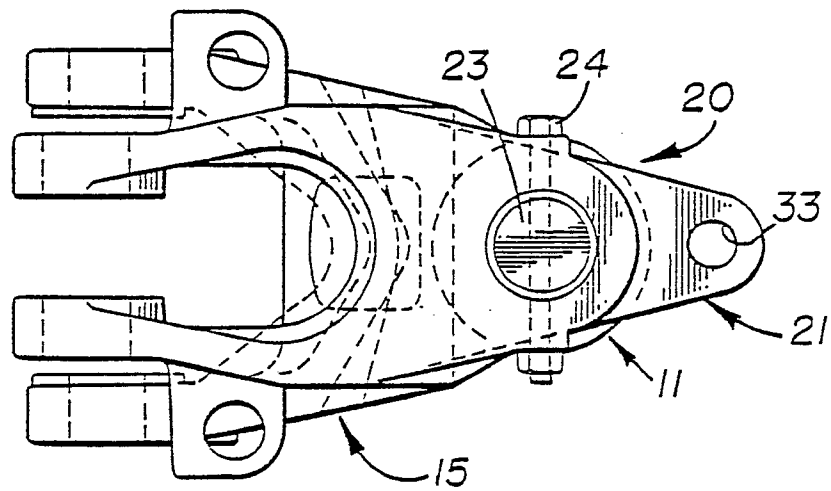


FIGURE 2

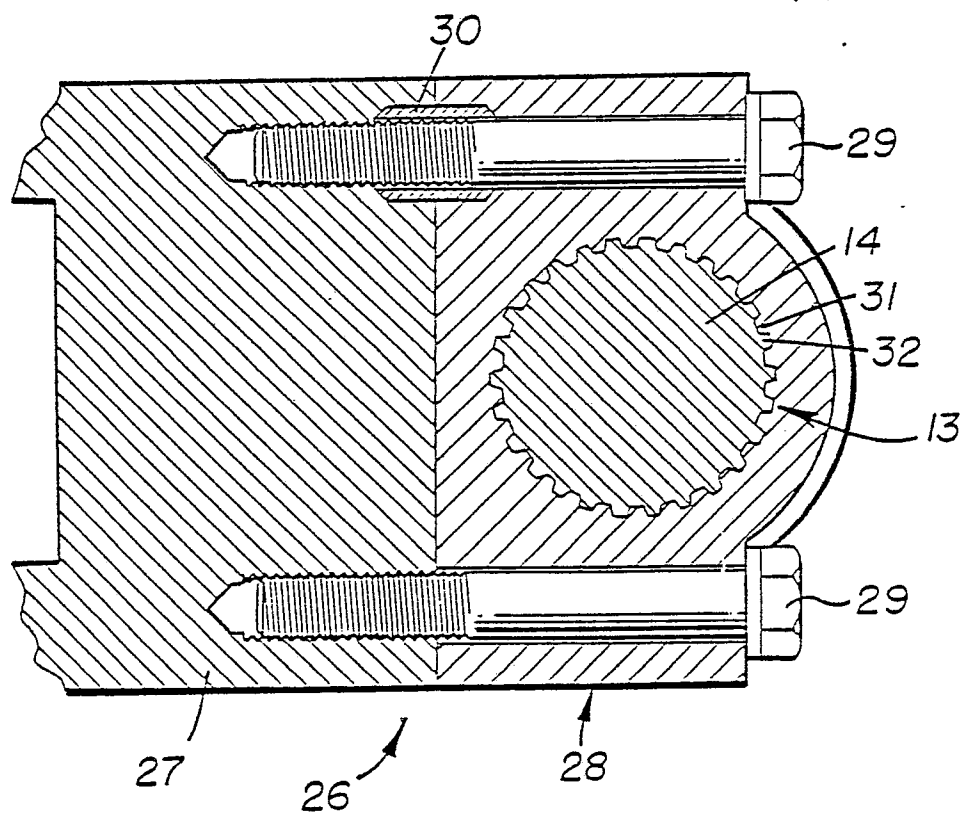


FIGURE 3