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(54) **Fill and compaction roller using readily replaceable cleat assemblies.**

(57) A compaction roller (10) includes improved cleat assemblies (18,19) which employ readily removable wear caps (29, 44). One style of cleat assembly (18) employs means inhibiting twisting of the cap unit about vertical and horizontal axes relative to the support base. A base portion (22, 38) is welded to the roller and the removable cleat assemblies (18, 19) attached by means of a coupling pin (28, 54) secured by split rings (27). The invention has application to rollers used in sanitary land fill operations and by avoiding the need to cut off welded cap units encourages cap units to be replaced when worn to thereby avoid wear damage to the roller.

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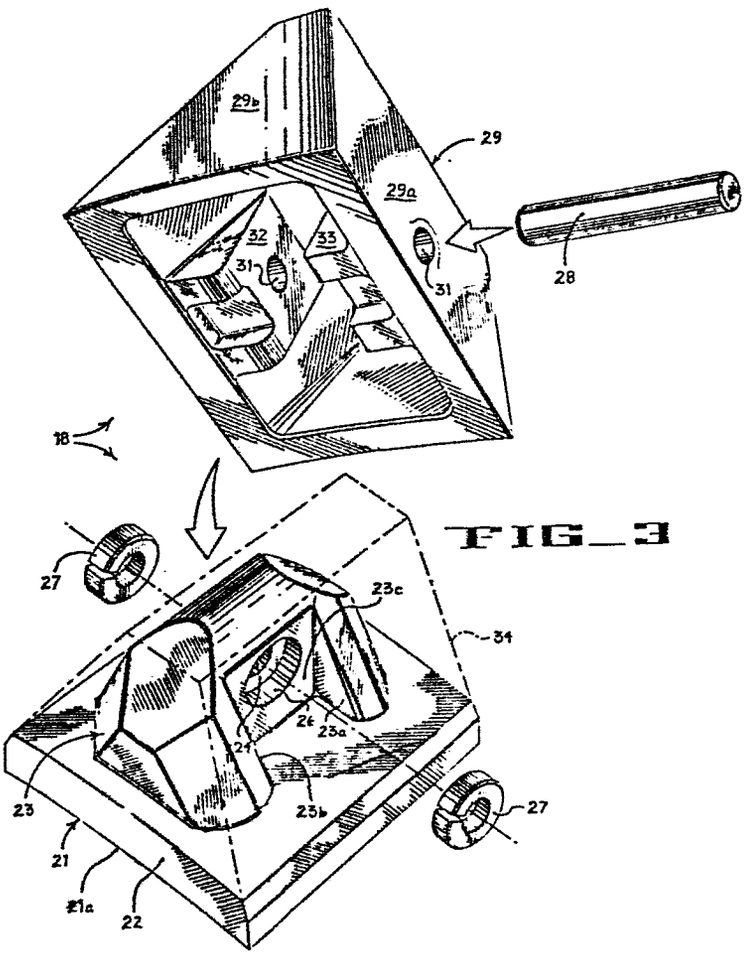


FIG_3

FILL AND COMPACTION ROLLER USING READILY REPLACEABLE CLEAT ASSEMBLIES

This invention concerns generally compaction machinery such as a roller for mounting upon a driven compaction vehicle, the roller having both destructive and tractive characteristics adapted to break up, crush, grind and compact materials of the size of home appliances as encountered in sanitary land fill operations.

Compaction rollers and wheels used on land fill operations and particularly sanitary land fill operations are equipped generally with cleats or feet of a type for grinding and crushing the material beneath it so as to reduce the material in size for compaction. As shown in U. S. Patent 3,922,106, an earth and sanitary fill compaction roller has been shown employing two different types of feet having replaceable wear caps as part of its cleat assemblies. The wear caps are welded to a base portion of the assembly which in turn is welded to the roller.

While the foregoing arrangement operates entirely satisfactorily, users of the equipment have been known to permit the wear caps to become worn well past the point of replacement. In such an instance, the base portion becomes partially worn away so that a new wear cap will no longer fit properly onto its base portion and the entire cleat assembly must be replaced on the roller.

It has been determined that the primary reason that the wear caps are not replaced at an appropriate time to avoid damage to the base which supports it is found in the fact that the operator must employ a cutting torch to cut them from the roller since they are welded on. This extra annoyance contributed to the harmful procrastination.

According to the present invention there is provided a fill and compaction roller of a type having a rigid cylindrical body supported for rotation from a vehicle chassis and having cleat assemblies carried by the body, the cleat assemblies each comprising a rigid mounting pad assembly having a base portion attached to said body and a cap unit attached to the base portion characterised in that the cap unit is detachable and readily releasably coupled to said base portion.

An advantage of such an arrangement is that a compaction roller has been provided wherein the wear cap can be readily removed using common tools available at the job site. In this way replacement of the wear caps before the supporting base becomes worn to a point requiring its removal has been encouraged.

Preferably the cap unit of each cleat is releasably attached to the base portion by a coupling pin.

Preferably each cap unit includes a bracket integral to said base portion protruding generally

radially outwardly therefrom and having a coupling opening extending transversely through the bracket, and wherein the cap unit comprises a generally hollow body including sloping upwardly converging outer sidewalls and transverse end walls extending between the end edges of said side walls, a pair of aligned openings respectively being formed through the side walls and aligned with said coupling opening for receiving the coupling pin therethrough, which coupling pin is disposed through said coupling opening and said aligned openings to retain said cap unit to said mounting pad assembly, and there being further provided locking means for readily releasably locking said pin in said openings to prevent decoupling of said cap unit from said pad assembly.

Advantageously the locking means includes annular recesses surrounding each end of said coupling opening, radially enlargeable split rings disposed within each said recess, the opening within said rings having a smaller diameter than the diameter of said coupling pin whereby forcing said pin through said rings enlarges them to cause the rings to grip the pin on both sides of said bracket for retaining the removable cap unit thereto.

Conveniently the locking means includes means serving to closely guide said cap unit on to said bracket including a pair of confronting substantially parallel abutments extending radially outwardly along the inner surface of the confronting sloping walls of the hollow body of said cap unit, said aligned openings being disposed to extend through said

abutments, said bracket having a pair of transverse flanges flanking each end of said coupling opening to form a guide slot at opposite ends of the opening for receiving an associated one of said abutments slidably therein, said abutments being closely spaced to said rings to capture and retain said rings in their associated recesses.

Preferably the rigid mounting pad assembly has a base portion adapted to be welded to the body.

According to a further aspect of the invention there is provided a cleat assembly for use in a roller as hereinbefore desclosed.

An advantage of the invention is to provide a cleat assembly of a type requiring minimal time and labor to replace using ordinary tools.

The foregoing and other advantages of the invention will become more readily evident from the following detailed description of preferred embodiments when considered in conjunction with the drawings of which:

Figure 1 shows a side elevation diagrammatic view of a fill and compaction roller according to the invention;

Figure 2 shows an enlarged detailed view of the "tread" portion of the roller in Figure 1 and disclosing both tractive and crushing cleats;

Figure 3 shows a diagrammatic exploded perspective view of a cleat assembly, the lower portion of the figure being viewed from above and the upper portion being viewed from beneath;

Figure 4 shows a plan view of the wear cap of the cleat assembly of Figure 3 viewed from beneath;

Figure 5 shows a top plan view of the rigid mounting pad assembly shown in Figure 3;

Figure 6 shows a diagrammatic transverse section view of an assembled cleat assembly of the type shown in Figure 3 taken along the plane of the horizontal diameter of the coupling pin; and

Figure 7 shows a side elevation section view of a cleat assembly of a type for crushing.

A compaction roller 10 constructed according to the present invention and diagrammatically illustrated in Figure 1 mounted upon a power-driven vehicle 13 (shown only fragmentarily) includes a rigid cylindrical body or rim 11 connected to a centrally disposed drum 12. The roller assembly 10 is

represented diagrammatically and can be constructed according to U. S. Patent No. 3,724,342 assigned to Caron Compactor Company to incorporate cushioning elements, cleaning members, and the like.

Roller 10 has been mounted upon a perimeter frame 14 of vehicle 13. Frame 14 is of a type including cross members 16, 17 extending across the tread of the roller 10.

Cleat assemblies 18, 19 as described more fully below are arranged on the outer surface of the cylindrical rim 11. Cleat assemblies 18 primarily serve to provide traction while the primary function of assemblies 19 is to crush materials.

As shown in Figure 3 cleat assembly 18 includes a rigid mounting pad unit 21 having a base portion 22 curved along edge 21a to conform to the curvature of rim 11 so as to be adapted to be welded to the rigid body formed by rim 11. A bracket 23 formed integral with base portion 22 protrudes generally radially outwardly therefrom.

A coupling opening 24 extends transversely of bracket 23 and enlarged annular recesses 26 surround each end of opening 24.

Radially enlargeable split rings 27 when disposed within recesses 26 serve to lock a coupling pin 28 therein as described further below for retaining a wear cap unit 29. Accordingly wear cap unit 29 is adapted to be readily releasably coupled to base portion 22. Wear cap unit 29 has a generally hollow body including sloping upwardly converging outer side walls 29a and transverse end walls 29b extending between the end edges of side walls 29a. A pair of aligned openings 31 extend through side walls 29a in position to be aligned with coupling opening 24 of bracket 23. In this way coupling pin 28 can be readily disposed to extend through openings 31 and 24 to couple wear cap unit 29 to its mounting pad unit 21.

Means for readily releasably locking pin 28 in openings 31, 24 serves to prevent decoupling of cap unit 29 from pad assembly 21 as now to be described.

While the diameter of openings 31, 24 is sufficient to readily permit the insertion of pin 28 therethrough, the inner diameter of split rings 27, is somewhat less than that of coupling pin 28. Accordingly, in order to dispose coupling pin 28 fully within openings 31 it is necessary for it to be forced through the center of each split ring 27. Thus, as shown in Figure 6 pin 28 has been disposed within openings 31, 24, and through each of split rings 27 so that pin 28 cannot be inadvertently or accidently removed.

When it is desired to remove cap unit 29 a hammer can be used to drive a screw driver against an end of pin 28 to move it through cap unit 29 until pin 28 is released from split rings 27.

Within cap unit 29 means have been provided serving tc closely guide cap unit 29 onto bracket 23. Accordingly a pair of confronting substantially parallel abutments 32, 33 extend radially outwardly along the inner surface of the confronting sloping walls 29a of the hollow body of cap unit 29.

As noted above openings 31 extend through these abutments in alignment with coupling opening 24 of bracket 23. The confronting faces 23a, 23b of a pair of transverse flanges flank each end of coupling opening 24 to form a guide slot at opposite ends of opening 24 for receiving an associated one of abutments 32, 33.

Bracket 23 includes a registration surface or face 23c extending between the confronting faces 23a, 23b. When cap unit 29 has been disposed onto bracket 23 as represented by the phantom lines 34 in Figure 3 the opposed faces of abutments 32, 33 will be disposed in closely spaced relation to the registration surfaces 23c of bracket 23 so as to fully

capture split rings 27 in their respective recesses 26.

Accordingly, after cap unit 29 has been placed over mounting pad unit 21, and with split rings 27 disposed within their respective recesses 26 the faces of abutments 32, 33 will be closely spaced from and capture rings 27 whereby as pin 28 is inserted through the first opening 31 the first ring 27 encountered will be expanded radially as pin 28 is driven into the wear cap unit 29. Pin 28 will enter the second split ring and expand it as well because the face of its associated abutment 32 (as shown) will prevent the ring from being moved out of its recess by pin 28.

Thus, as explained above, bracket 23 includes a pair of "slots" on opposite sides of the bracket for receiving abutments 32, 33. The "slots" are defined by the wall faces 23a, 23b and 23c. Accordingly, these guide "slots" serve to receive an associated one of the abutments closely spaced therein.

From the foregoing it will be readily evident that there has been provided an improved cleat assembly such as cleat assembly 18 wherein the wear cap can be readily removed using ordinary tools of the type found at the job site simply by driving the pin 28 far enough through the cap unit 29 to release both split rings 27 therefrom.

It has been observed that the time and labor involved in replacing a worn-out wear cap according to this invention is sufficiently minimal that the wear caps are more likely to be replaced before damage is incurred by the rigid mounting pad unit 21, causing it to be cut off and replaced.

In this way it is possible to avoid the unnecessary extra time and expense required in cutting off the damaged rigid mounting pad units 21.

A cleat assembly 19 primarily used for crushing, breaking and grinding of materials of the size of home appliances as

encountered in sanitary land fill operations includes a rigid mounting pad unit 37 including a rigid metallic base portion 38. Base portion 38 supports an elongate relatively thin aligning guide 39 formed integrally with base portion 38.

Aligning guide 39 includes an upwardly extending bracket portion 41 characterized by an upwardly protruding key 42 disposed within a downwardly opening pocket 43 defined within a removable wear cap 44.

The rigid mounting pad assembly 37 and its associated aligning guide 39 support wear cap 44 from within in a manner to minimize twisting and bending of wear cap 44 with respect to base portion 38. Accordingly, aligning guide 39, including key 42, serves to provide three spaced points of support as now to be described.

The hollow interior 46 of cap 44 slopes downwardly and away to form a notch 47, 48 for receiving the tip ends 49, 51 of guide 39. Accordingly, as thus mounted, by lodging the tips 49, 51 in notches 47, 48 wear cap 44 is restrained against being twisted relatively to base portion 38 about an axis normal thereto, such as axis 52.

Further, key 42 engaged in pocket 43 serves to restrain wear cap 44 from being twisted laterally with respect to base portion 38, for example, as about the axis 53 parallel to base portion 38.

Finally, a coupling pin 54 extends through an opening disposed transversely of bracket portion 41 as described above with regard to bracket 23. Each end of the coupling opening 56 is similarly surrounded by an annular recess 57.

Coupling pin 54 accordingly retains wear cap 44 to mounting pad assembly 37.

Finally, the underside of base portion 38 is arcuately formed to conform to the peripheral surface of rim 11 and adapted to be welded thereto.

In this way as wear cap 44 becomes worn, it can be readily replaced without undue expenditure of labor and time.

CLAIMS

1. A fill and compaction roller (10) of a type having a rigid cylindrical body (11) supported for rotation from a vehicle chassis and having cleat assemblies (18,19) carried by the body, the cleat assemblies each comprising a rigid mounting pad (21,37) assembly having a base portion (22,38) attached to said body and a cap unit (29,44) attached to the base portion characterised in that the cap unit is detachable and readily releasably coupled to said base portion.

2. A fill and compaction roller as claimed in Claim 1 characterized in that the cap unit of each cleat assembly (18,19) is releasably attached to the base portion (22,38) by a coupling pin (28,54).

3. A fill and compaction roller as claimed in Claim 2 characterised by each cap unit (29,44) including a bracket (23,41) integral to said base portion (22,38) protruding generally radially outwardly therefrom and having a coupling opening (24,56) extending transversely through the bracket, and wherein the cap unit comprises a generally hollow body including sloping upwardly converging outer sidewalls (29a) and transverse end walls (29b) extending between the end edges of said side walls, a pair of aligned openings (31) respectively being formed through the side walls and aligned with said coupling opening (24,56) for receiving the coupling pin (28,54) therethrough, which coupling pin being disposed through said coupling opening and said aligned openings to retain said cap unit to said mounting pad assembly, and there being further provided locking means (27) for

readily releasably locking said pin in said openings to prevent decoupling of said cap unit from said pad assembly.

4. A fill and compaction roller according to Claim 3 characterised in that the locking means includes annular recesses surrounding each end of said coupling opening, radially enlargeable split rings (27) disposed within each said recess, the opening within said rings having a smaller diameter than the diameter of said coupling pin (28,54) whereby forcing said pin through said rings enlarges them to cause the rings to grip the pin on both sides of said bracket (23,41) for retaining the removable cap unit (29,44) thereto.

5. A fill and compaction roller according to Claim 4 characterised in that the locking means (27) includes means serving to closely guide said cap unit on to said bracket including a pair of confronting substantially parallel abutments (32,33) extending radially outwardly along the inner surface of the confronting sloping walls of the hollow body of said cap unit (29,44), said aligned openings (31) being disposed to extend through said abutments, said bracket (23,41) having a pair of transverse flanges flanking each end of said coupling opening to form a guide slot at opposite ends of the opening for receiving an associated one of said abutments slidably therein, said abutments being closely spaced to said rings to capture and retain said rings in their associated recesses.

6. A cleat assembly for attachment to a fill and compaction roller as claimed in any preceding claim

characterised in that the cleat assemblies (16,29) each comprise a rigid mounting pad assembly (21,37) having a base portion (22,38) adapted to be welded to said body (11).

7. A cleat assembly for attachment to a fill and compaction roller of a type having a rigid annular body, characterised in that said assembly comprising a rigid mounting pad assembly (21,37) having a base portion (22,38) adapted to be welded to said body (11) and a bracket (23,41) integral to said base portion protruding generally radially outwardly therefrom, a coupling opening (24,56) extending transversely through said bracket, a cap unit (29,44) adapted to be readily releasably coupled to said base portion, said cap unit having a generally hollow body including sloping upwardly converging outer side walls (29a) and transverse end walls (29b) extending between the end edges of said side walls, a pair of aligned openings (31) respectively formed through the side walls and aligned with said coupling opening for receiving a coupling pin (28,54) therethrough, a coupling pin disposed through said coupling opening and said aligned openings to retain said cap unit to said mounting pad assembly, and locking means (27) for readily releasably locking said pin in said openings to prevent decoupling of said cap unit from said pad assembly.

8. A cleat assembly according to Claim 7 in which the locking means includes annular recesses surrounding each end of said coupling opening, radially enlargeable split rings (27) disposed within each said recess, the opening within said rings having a smaller diameter than the diameter of said

coupling pin (28,54) whereby forcing said pin through said rings enlarges them to cause the rings to grip the pin on both sides of said bracket for retaining the pin in said cap unit.

9. A roller as claimed in any of Claims 1 to 6 characterised by including cleat assemblies of two types (18,19) which are adapted for tractive and crushing use respectively.

10. A roller as claimed in Claim 9 characterised in that the tractive cleats (18) include means inhibiting twisting of the cap unit about vertical and horizontal axis relative to the base portion (38).

FIG_2

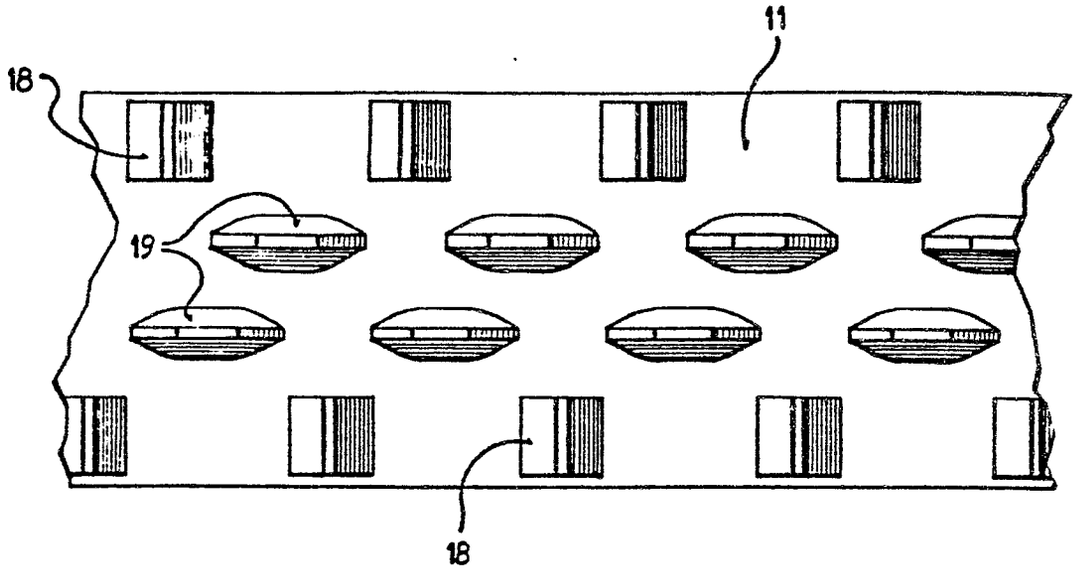
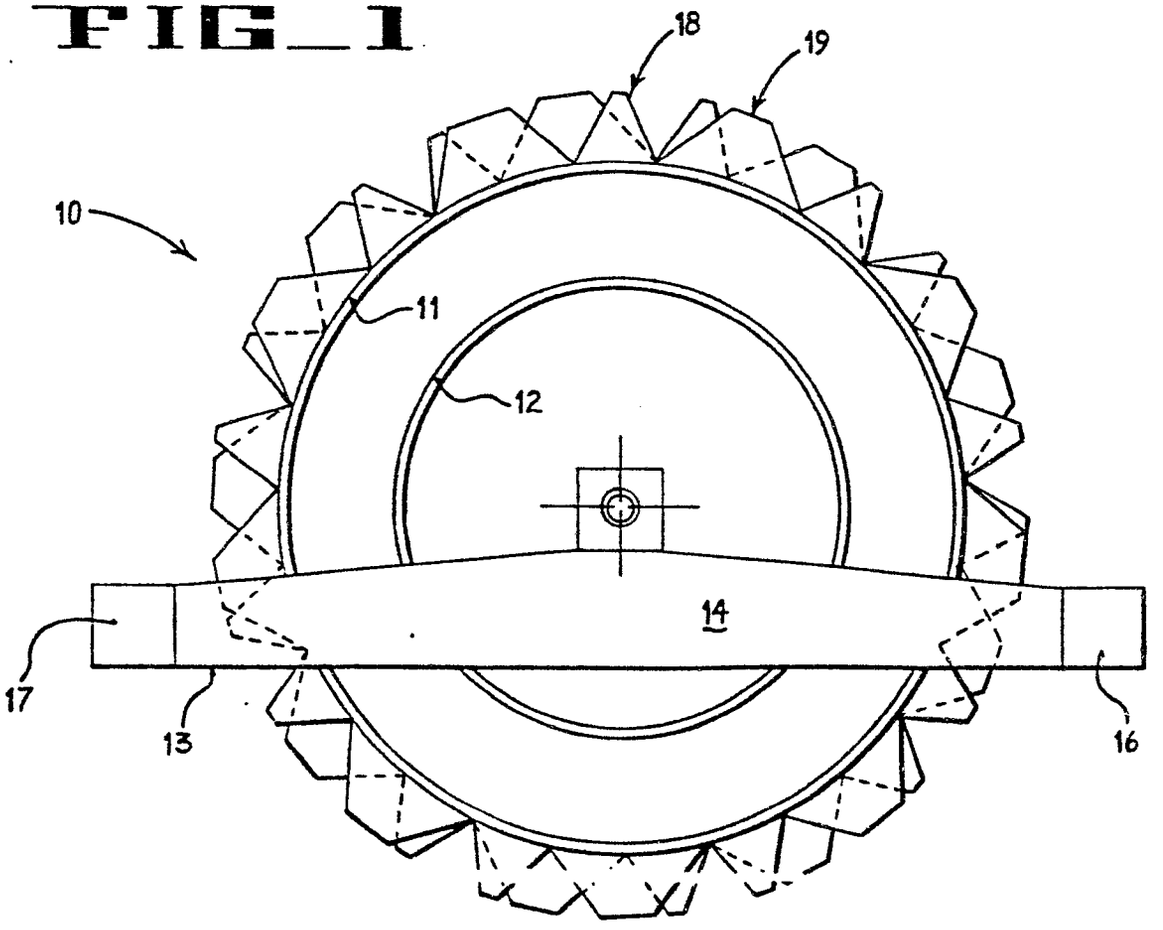


FIG_1



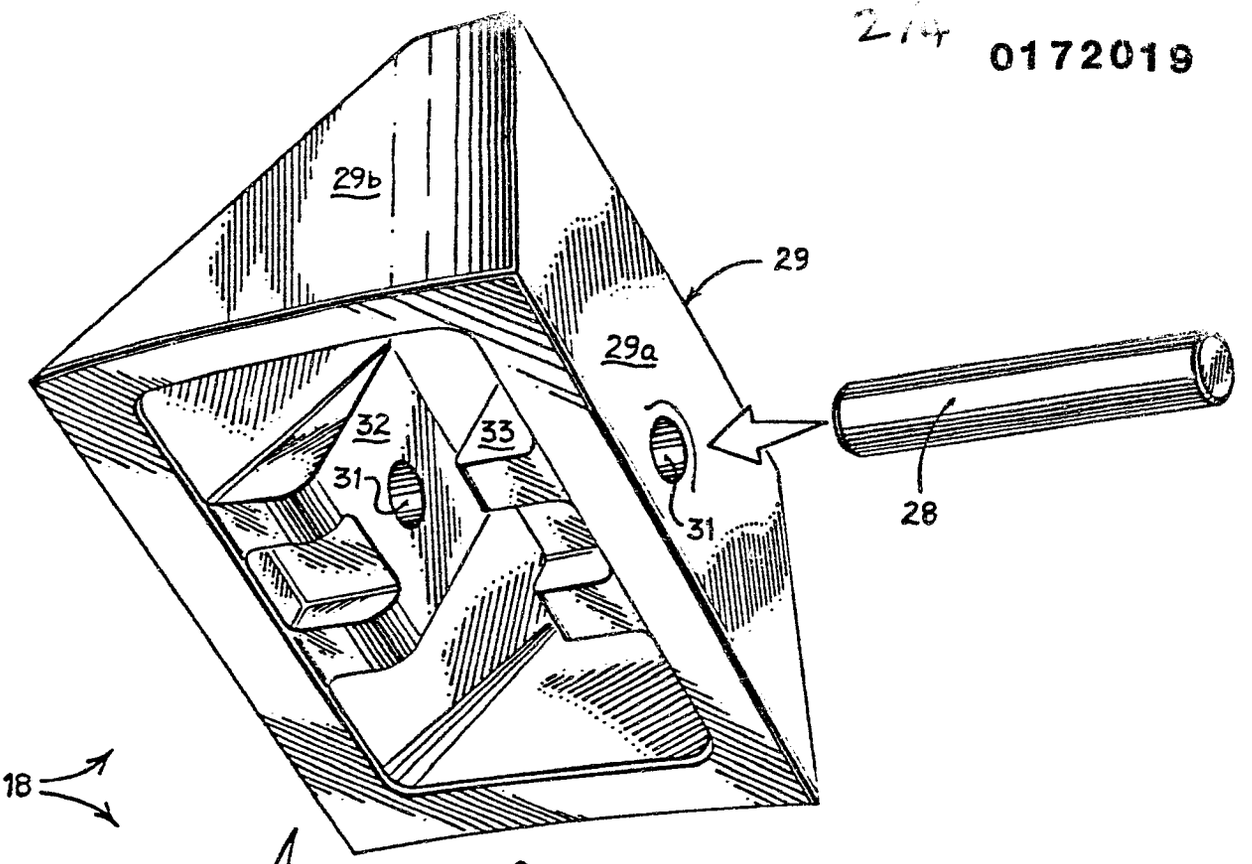
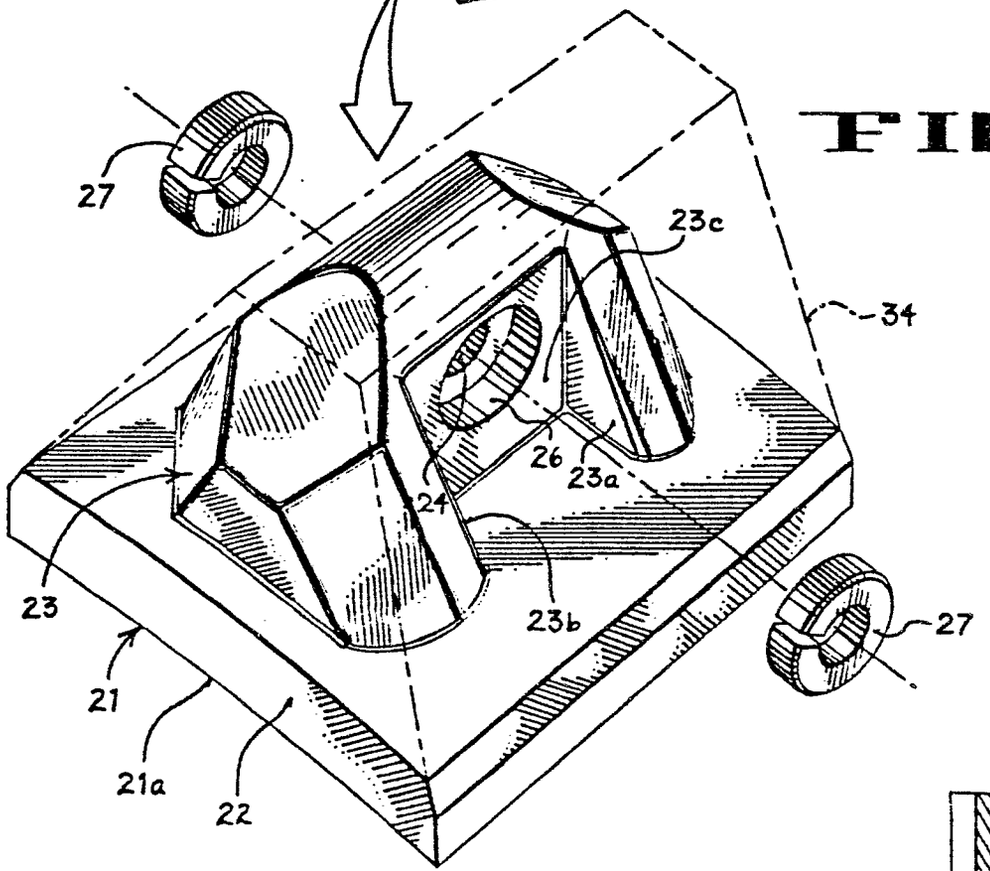

29b
29
29a
32
33
31
31
28
18

FIG_3


27
23c
34
26
23a
24
23
23b
27
21
21a
22

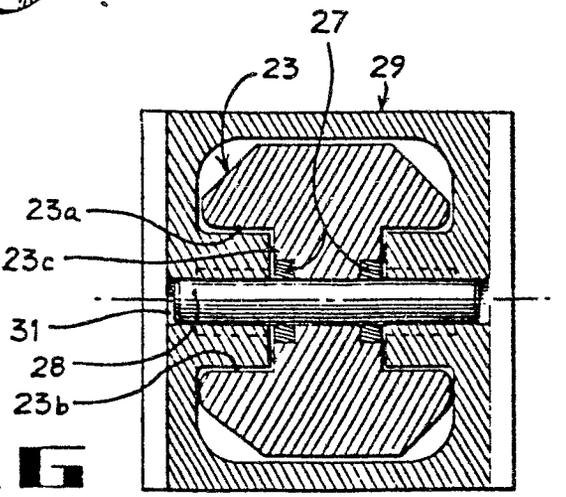

27
23
29
23a
23c
31
28
23b

FIG_6

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FIG_4

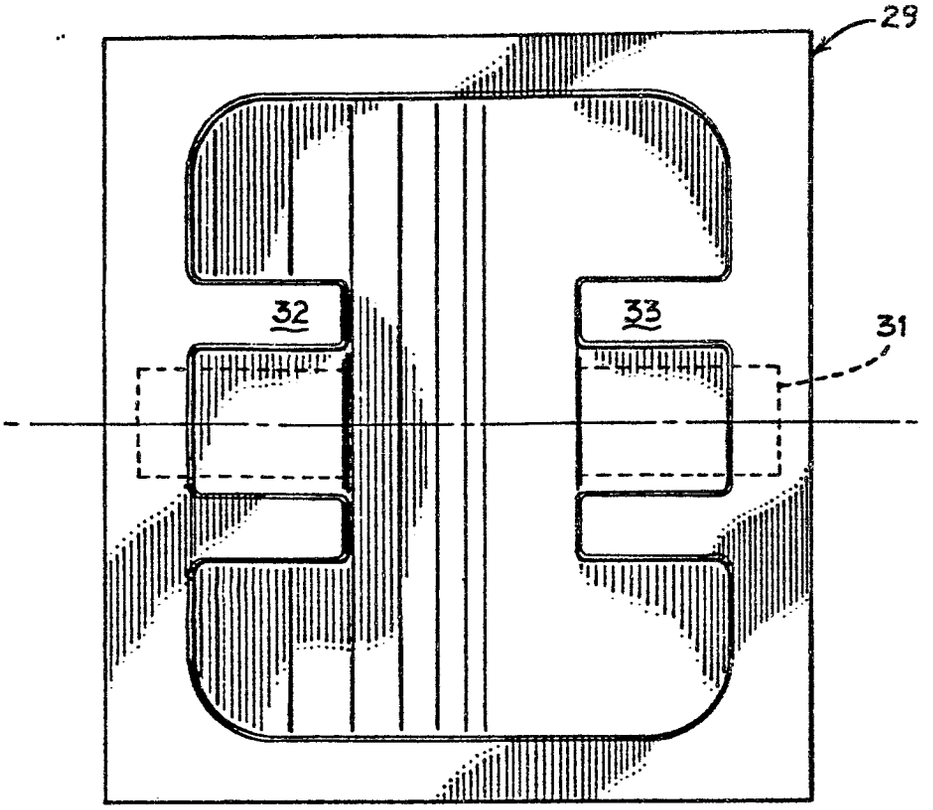

FIG_5

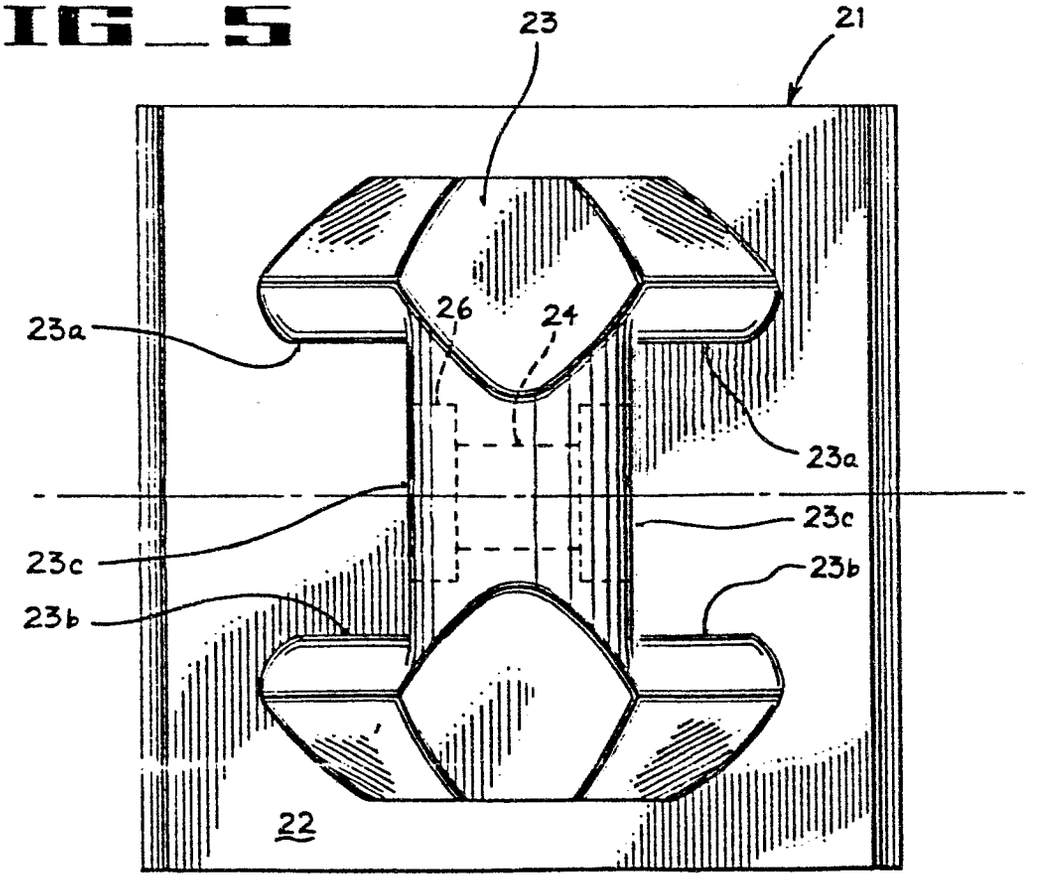

FIG_7