United States Patent [19]

Larson

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[54] **SWIVEL MOUNTED LIFTING EYE FOR ENGINES**

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[73] Assignee: **Caterpiller Tractor Company,** Peoria, Ill.

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[52] **U.S. Cl.** ..... **294/82 R;** 105/475; 248/499

[51] **Int. Cl.²** **B66C 1/10;** B66C 1/24

[58] **Field of Search** ..... 16/126, 127; 24/115 K, 24/201 R, 230.5 SS, 68 DC, 230.5 TD; 52/125; 105/475–485; 248/119 R, 499; 294/82, 89; 403/119, 150–153, 157, 164

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[57] **ABSTRACT**

A lifting eye arrangement, adapted to be attached to an engine block or cylinder head by a single bolt, comprises a pair of annular members having hub portions thereof disposed in back-to-back relationship to define an annular groove on the periphery of axially spaced base portions thereof. A ring member is rotatably mounted in the groove and a U-shaped lifting eye is pivotally mounted on a pair of projections secured to the ring member and extending radially outwardly therefrom.

9 Claims, 4 Drawing Figures

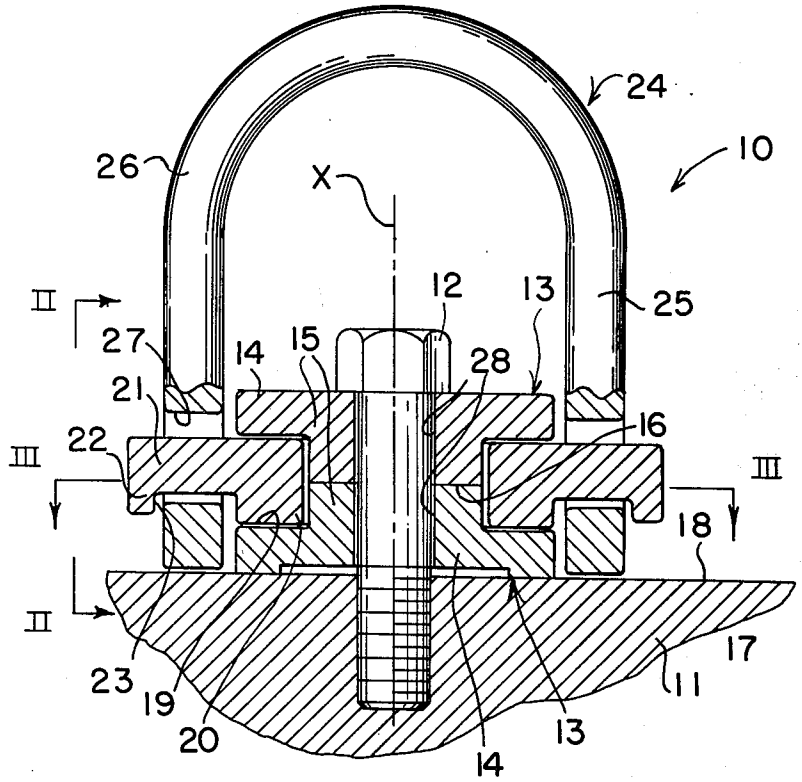


Fig. 1

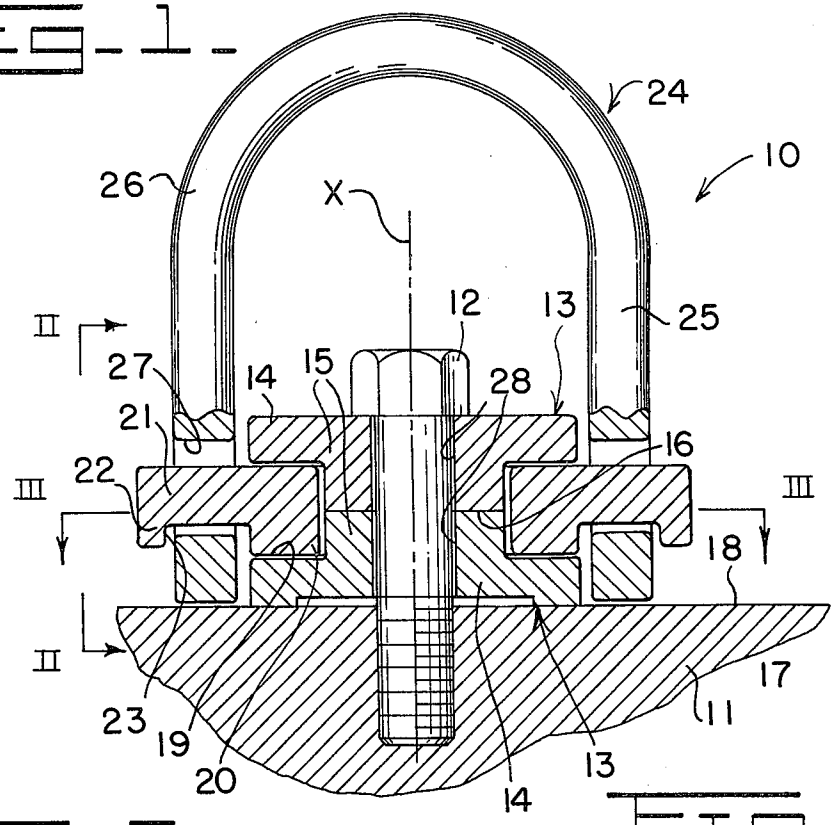


Fig. 2

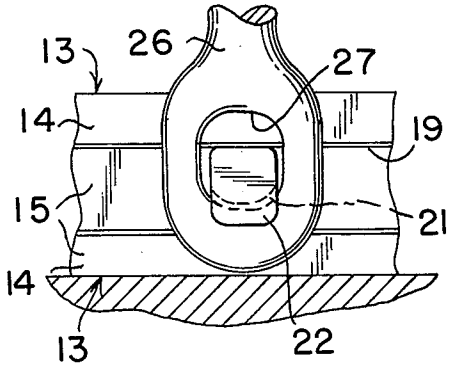


Fig. 3

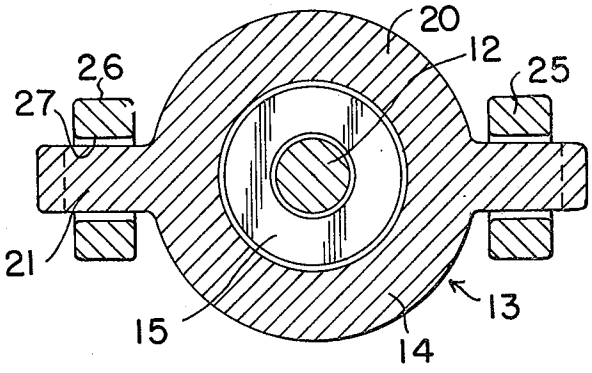
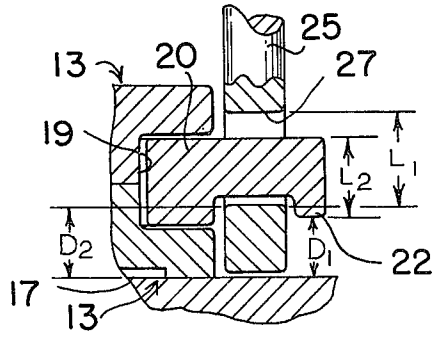


Fig. 4



SWIVEL MOUNTED LIFTING EYE FOR ENGINES

BACKGROUND OF THE INVENTION

A pulley block or the like is normally attached to a lifting eye secured to an engine for installing the engine on the frame of a vehicle or for removing it therefrom for servicing purposes. It is desirable to afford at least substantial universal movement of the lifting eye relative to the engine. An example of such a lifting eye is disclosed in U.S. Pat. No. **3,297,293.**

SUMMARY OF THIS INVENTION

An object of this invention is to provide a noncomplex and economical lifting eye arrangement adapted for attachment to an engine. The lifting eye comprises a pair of annular members each comprising a base portion and a cylindrical hub portion with such hub portions being disposed in back-to-back relationship to define an annular groove on the periphery of the members. A ring member is rotatably mounted in the groove and has a pair of diametrically opposed projections extending radially outwardly therefrom and a U-shaped lifting eye is pivotally mounted on the projections.

BRIEF DESCRIPTION OF THE DRAWING

Other objects of this invention will become apparent from the following description and accompanying drawing wherein:

FIG. **1** is a sectioned front elevational view of a lifting eye arrangement of this invention, attached to an engine block;

FIGS. **2** and **3** are views taken in the direction of arrows II—II and III—III in FIG. **1,** respectively; and

FIG. **4** illustrates design parameters for the lifting eye arrangement.

DETAILED DESCRIPTION

FIGS. **1–3** illustrate a lifting eye arrangement **10** of this invention releasably attached to an engine block **11** by a single bolt **12** disposed on a central longitudinal axis X thereof. Such arrangement comprises a pair of substantially identical annular members **13** each having an annular base portion **14** and a cylindrical hub portion **15** formed integrally on one side thereof. The members are disposed in back-to-back relationship to have the hub portions thereof abut each other at flat bearing surfaces **16.**

A flat annular bearing surface **17** of the base portion of the lower one of the members abuts a flat upper surface **18** of the engine block to provide a substantial bearing contact therebetween. The outside diameter of each hub portion **15** is substantially less than the corresponding outside diameter or dimension of a respective base portion **14** to thus define a common annular groove **19** circumferentially about the hub portions and axially between the base portions. An annular ring member **20** is rotatably mounted in the groove and has a pair of diametrically opposed and integrally formed lifting lugs or cylindrical bearings **21** projecting radially outwardly thereform beyond members **13.**

A downwardly extending flange **22** is integrally formed on the outer end of each lug to define a notch **23** on the underside of the lug, radially between the main body portion of ring member **20** and the flange. A U-shaped lifting eye **24** has a pair of parallel legs **25** and **26** each having a respective flange **22** mounted on an outboard side thereof and each defining an elongated slot **27** therethrough. The lifting eye is mounted on the lugs of ring member **20** at such slots prior to projection of bolt **12** through aligned bore **28** formed through members **13** and securance of the bolt to the engine block.

To facilitate such lateral mounting, it should be noted in FIG. **4** that the axial length L_1 of each slot **27** is slightly greater than the axial length L_2 of each flange **22.** Furthermore, the axial distance D_1, between the lower end of each flange **22** and bearing surface **17,** is preferably less than the axial distance D_2, between a lower end of slot **27** and bearing surface **17.** Such construction and arrangement will prevent removal of the lifting eye laterally past either one of flanges **22** upon installation of the lifting eye arrangement on the engine.

I claim:

1. A lifting eye arrangement disposed on a central longitudinal axis thereof and adapted for attachment to an engine block or the like comprising

a pair of annular members each comprising a base portion and a cylindrical hub portion formed integrally on one side of said base portion, the outside diameter of each of said hub portions being substantially less than the corresponding outside dimension of a respective base portion,

the hub portions of said members disposed in back-to-back relationship to define a common annular groove circumferentially about said hub portions and axially between said base portions,

a ring member rotatably mounted in said groove and having a pair of diametrically opposed lugs extending radially outwardly therefrom beyond said members,

a U-shaped lifting eye having a pair of legs each pivotally mounted on a respective one of said lugs,

a flange secured on the end of each of said lugs to extend in the direction of said axis and disposed on an outboard side of a respective one of said legs, and

an elongated slot formed through each leg of said lifting eye to extend in the direction of said axis along such leg, each of said lugs mounted in a respective one of said slots and wherein the axial distance between a lower end of said flange and an opposite side of a base portion of an adjacent base member, opposite to the side thereof having said hub portion thereon, is less than the axial distance between a lower end of said slot and the end of the leg carrying said slot.

2. The lifting eye arrangement of claim **1** wherein said members are at least substantially identical and said lugs are formed integrally therewith.

3. The lifting eye arrangement of claim **1** wherein said hub portions abut at flat surface portions thereof.

4. The lifting eye arrangement of claim **1** wherein one side of a base portion of at least one of said members, opposite to the side thereof having said hub portion formed thereon, is flat to provide a substantial bearing surface thereat.

5. The lifting eye arrangement of claim **1** wherein each of said lugs comprises a cylindrical bearing.

6. The lifting eye arrangement of claim **1** further comprising a notch defined on an underside of each of said lugs, radially between a respective flange and said ring member.

7. The lifting eye arrangement of claim 1 wherein the axial length of each of said slots in the direction of said axis is slightly greater than the axial length of each of said lugs taken in the direction of said axis whereby said lifting eye may be removed laterally from said ring member.

8. The lifting eye arrangement of claim 4 further comprising an engine and fastening means releasably attaching said lifting eye arrangement to a flat surface of said engine at the flat side of a lower one of said members.

9. The lifting eye arrangement of claim 8 wherein said fastening means comprises a single bolt projecting through aligned bores formed axially through said members and threadably attached to said engine.

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