Oct. 10, 1961 E. F. PETERSON 3,003,733

MOUNTING MEANS ESPECIALLY FOR VIBRATORS

Filed Jan. 7, 1960

FIG. 1

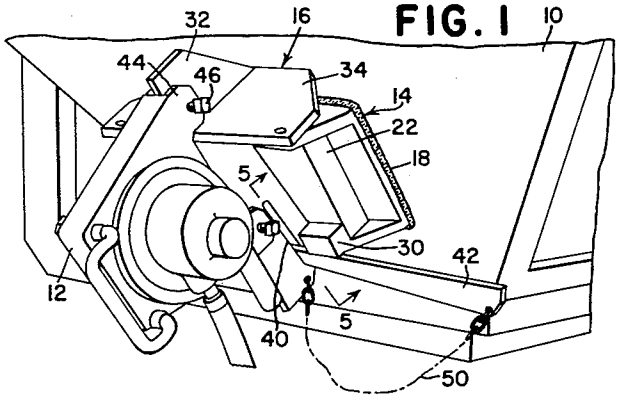


FIG. 4

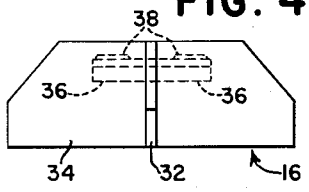


FIG. 6

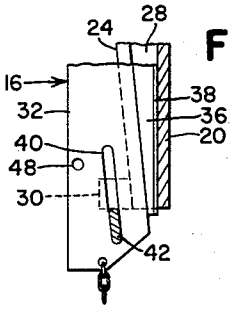


FIG. 2

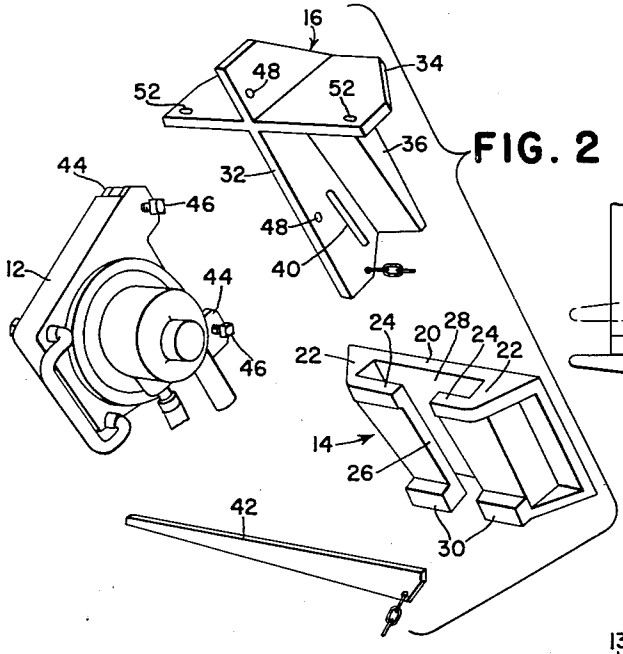


FIG. 5

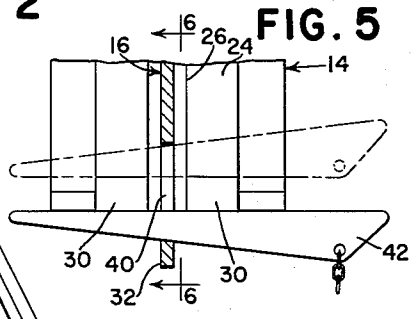
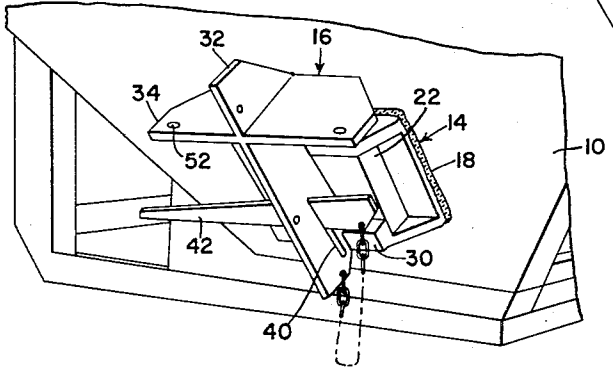


FIG. 3



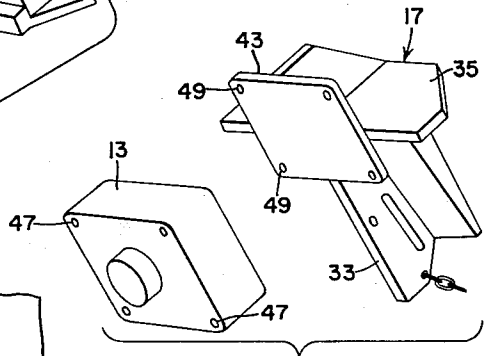


FIG. 7

INVENTOR.
E. F. PETERSON

BY

ATTORNEY

United States Patent Office 3,003,733 Patented Oct. 10, 1961

3,003,733

MOUNTING MEANS ESPECIALLY FOR VIBRATORS

Edwin F. Peterson, % Martin Engineering Company, Neponset, Ill.

Filed Jan. 7, 1960, Ser. No. 1,129
14 Claims. (Cl. 248—224)

This invention relates to a mounting means and more particularly to such means especially adapted for the mounting of vibrators on structures to be vibrated.

In a typical installation of the general character referred to, a structure such as a container, receptacle, etc., containing fluent or granular material and the like, may be more easily unloaded, for example, by the mounting thereon of a vibrator which creates vibrating forces which tend to influence the flow of the material. A well-known example of such installation is that appearing in railway hopper cars, which are conventionally supplied with female mounting means for the receipt of a male member which in turn carries the vibrator. One of the great problems encountered in this art is the mounting and dismounting of the male member, which has heretofore been accomplished only at the expense of relatively arduous labor involving the use of a sledge for driving the male member into place and for releasing the male member after use. Obviously, the mounting means must be such as to accomplish a relatively tight and rigid mounting, because otherwise the vibrator would cause the mounting means to deteriorate. At the same time, this requirement conflicts with ease of removal, which is important because vibrators are changed from car to car and cannot be left in place while the cars are in transit.

According to the present invention, this disadvantage is eliminated by the provision of an improved mounting means having a relatively simple expedient for accomplishing tightening of the mounting and at the same time being useful in releasing the mounting when the vibrator and male member must be removed. The invention features a novel mounting means including interlocking wedging members plus an auxiliary wedging device which is operative in an extremely simple manner to improve the wedging action between the male and female members. It is an object of the invention to enable the wedging member to be used in accomplishing the release of the male member from the female member. Other objects of the invention reside in the provision of a mounting means of simple and inexpensive design, the provision of means which may be readily attached to structures of known types, and such other improvements and features inherent in and encompassed by the invention, as will more readily appear from the following disclosure of preferred embodiments of the invention, shown, by way of example, in the accompanying sheet of drawings, the several figures of which are described below.

FIGURE 1 is a fragmentary perspective of a typical mounting utilizing the present invention.

FIGURE 2 is an "exploded" perspective showing the components of the mounting means and the associated vibrator.

FIGURE 3 is a perspective showing the manner in which the male member is releasable from the female member.

FIGURE 4 is a plan, on a slightly enlarged scale, of the male member.

FIGURE 5 is an enlarged fragmentary section as seen along the line 5—5 of FIGURE 1.

FIGURE 6 is a section on the line 6—6 of FIGURE 5.

FIGURE 7 is an "exploded" perspective of a modified form of male member and associated vibrator.

The structure to be vibrated is illustrated fragmentarily in FIGURE 1 as the bottom part of a conventional railway hopper car and is designated by the numeral 10. Those versed in the art will recognize the structure as involving the unloading of the car by means of a bottom door (not shown) through which the contents of the car are emptied. As already explained, it is conventional in situations of this character to employ the principle of vibration to influence the unloading operation. A typical vibrator is shown at 12 in FIGURE 1, and this vibrator is mounted on the hopper car 10 by means of a female member 14 and a male member 16.

The female member 14 is socketed and is an elongated element of relatively heavy metal, such as a casting having a back face which constitutes means for rigid affixation thereof to a wall of the hopper car, which may be conventionally accomplished by welding, as at 18. The socketed part of the member is of C-shaped section, made up of a back wall 20, a pair of opposite side walls 22 and a pair of front walls 24. The front walls are spaced apart to provide an elongated opening or slit 26 which runs lengthwise of the member, and the walls thus afford a channel 28 of T-shaped section. At this point, it should be noted that such expressions as "back," "front," etc. are used as terms of convenience and not of limitation, since the structure may be oriented otherwise than as illustrated.

The front walls 24 are provided respectively with integral abutments or lugs 30 which project outwardly or forwardly respectively at opposite sides of the slit 26. As best shown in FIGURE 6, the front and rear walls are interiorly tapered so as to converge toward one end of the channel, in this case the lower end. This, as will be explained, provides a wedging action in conjunction with the male member 16.

The male member is preferably of cruciform shape, including an elongated upright rib 32 and a rigid cross flange 34 which intersects the rib, the member in this respect being preferably fabricated of metal with the rib and flange welded together in the configuration shown. The rib 32, in conjunction with a back portion of the member gives the member in that area a T-shaped section which conforms generally to that of the channel 28 in the female member. The back portion is here constituted by a pair of lateral webs 36, one of which is rigidly secured, as by welding, to each side of the rib 32 and to the under surface of the cross flange 34, and each web is of tapered shape, as best seen in FIGURE 2, to conform to the taper in the socket 28. The tapered shape is improved by the provision on the back of each web of an integral elongated portion 38.

The mounting of the male member in the female member is accomplished by inserting the former downwardly in the latter, the T-shaped section of the member 16, as achieved by the rib 32 and webs 36, fitting the T-shaped channel 28 of the member 14. In a conventional situation, the member 16 would be "driven home" by a sledge and the vibrator, such as that at 12, subsequently attached. However, this procedure requires that the member 16 be released by striking it from the bottom with a sledge. In a typical railway situation, the bottom of the hopper car 16 is so close to the rails as to make it extremely difficult to swing a sledge with sufficient power to dislodge the male member. Accordingly, the operator will attempt to strike the male member at other portions thereof and eventually the male member becomes unfit for use. As previously outlined, the present invention eliminates these difficulties by improving the means by which the male member is tightened and released relative to the female member.

For this purpose, the rib 32 is so constructed that it has therethrough an elongated slot 40 just ahead of the front face of the webs 36 and inclined so as to lie generally parallel with these front faces. The upper and lower ends of the slot or slot means may be regarded as a pair

of force-receiving parts, respectively. When the male member is initially inserted in the female member, the lower end of the slot **40** serves as a reaction portion which projects beyond or below the level of the abutments **30**, and a wedge member **42** is inserted beneath one abutment, passed through the slot **40** and engages under the other abutment. The top and bottom of each abutment may be regarded as another pair of force-receiving parts and the wedge as a force-applying element. The wedge member may be struck lightly with a sledge and the forces created act on the abutments and react on the lower end of the slot and thereby draw the male member more tightly into the channel **28** of the female member. When it is required that the male member be released, the wedge member is driven in the opposite direction and is removed from beneath the abutments **30** and replaced above the abutments, the slot **40** being of sufficient length that its upper end is a second reaction portion at a level above the upper surfaces of the abutments. The insertion of the wedge in this second position enables the wedge to be struck with a sledge to create forces acting on the abutments and reacting on the upper end of the slot and tending to force the male member upwardly or out of the female member. The securing position of the wedge member **42** is shown in full lines in FIGURE 5 and the releasing position is shown in broken lines in the same figure. Also, FIGURE 3 shows the releasing operation of the wedge member, the vibrator **12** having been removed from the male member to more clearly illustrate the operation.

In the case of the male member just described, mounting of the vibrator **12** thereon is accomplished by the provision on the vibrator of a pair of bifurcated lugs **44**, each pair of which contains one or more set screws **46**. The rib **32** is provided thereon with a pair of apertures **48**, spaced lengthwise thereof on the order of the spacing between the set screws **46**. Installation of the vibrator involves straddling of the rib **32** by the bifurcated lugs **44**, followed by tightening of the set screws **46**, the points of which preferably enter the opening **48** to improve the connection between the vibrator and the mounting member **16**.

In the modified form of structure shown in FIGURE 7, the male member is designated at **17** and the vibrator is indicated by the numeral **13**. In this case, a mounting plate **43** is rigidly secured, as by welding, to the front edges of the rib **33** and cross flange **35**, and this plate is provided with a plurality of openings **49** to receive bolts (not shown) passed through cooperating openings **47** in the vibrator **13**. The illustration in FIGURE 7 demonstrates the versatility of a mounting member constructed along the lines of those shown at **16** and **17**, it being understood that the latter is in other respects similar to the former, having the same cooperative relationship with the female member **14**.

Two further features should be noted. In both forms of the invention disclosed, the wedge **42** and male member **16** (**17**) are tied together by a flexible element such as a chain **50**, the purpose of which is to prevent the wedge from flying when struck by the sledge in a releasing direction (to the right as seen in FIGURES 1, 2 and 3). This prevents injury to the operator and possible damage to the car and allied equipment. The second feature is the provision of holes **52** in the cross flange **34**, spaced on the order of the holes **48** and useful in mounting the vibrator **12** in a position at right angles to that shown.

The improved mountings shown are not of course limited to the environment shown but could be used elsewhere, as in providing readily mountable and removable male members for use successively with concrete forms and the like.

Features and advantages other than those enumerated herein will readily occur to those versed in the art, as will many modifications and alterations in the preferred embodiments disclosed here, all of which may be achieved without departure from the spirit and scope of the invention.

What is claimed is:

1. Means for mounting a vibrator on a structure to be vibrated, comprising: a female member having means thereon for rigid affixation thereof to such structure and further including an elongated socket element of C-shaped section made up of a back wall, opposite side walls and a pair of front walls spaced closely apart to provide a slit lengthwise of said element, said walls defining a channel of T-shaped section lengthwise of said element and opening at first and second opposite ends as well as outwardly via said slit, certain of said walls being interiorly shaped to converge toward said second end of the channel, said element having thereon a pair of abutments rigid respectively on the front walls and projecting outwardly respectively at opposite sides of the slit; an elongated male member of T-shaped section in which the bar of the T provides a web receivable by the channel via said first end and having tapered edges fitting the converging walls to tighten said male member in said female member, and the leg of the T providing a rib lengthwise of said male member and projecting outwardly through the slit and between and beyond the abutments, said rib having a slot lengthwise thereof and provided with opposite ends and one of said ends normally being spaced beyond the abutments; a wedge member insertable transversely through the slot and beneath the abutments to engage between the abutments and said end of the slot to create forces tending to draw the male member more tightly into the female member; and means on the male member outwardly of said rib for carrying a vibrator.

2. The invention defined in claim 1, in which: the slot is of such length that its other end projects to the other side of the abutments toward said first end of the channel so that the wedge member is removable from beneath the abutments for insertion through the slot at said other side of the abutments to engage with said other end of the slot for creating forces tending to urge the male member out of the female member.

3. The invention defined in claim 1, in which: the means for carrying the vibrator includes a flange intersecting the rib and rigid therewith and a mounting plate rigidly secured to said flange and rib.

4. The invention defined in claim 1, in which: the means for carrying the vibrator includes portions of the rib spaced apart lengthwise thereof.

5. Means for mounting a vibrator on a structure to be vibrated, comprising: a female member having means thereon for rigid affixation thereof to such structure and further including an elongated channel opening at first and second opposite ends as well as outwardly at one side and having walls interiorly shaped to converge toward said second end of the channel, said member having rigid thereon an abutment projecting outwardly adjacent to said open side of the channel; an elongated male member receivable by the channel via said first end and having tapered edges fitting the converging walls to tighten said male member in said female member, and said male member including a portion projecting outwardly through the open side of the channel alongside the abutment and having a slot lengthwise thereof and provided with opposite ends and one of said ends normally being spaced beyond the abutment; a wedge member insertable transversely through the slot and beneath the abutment to engage between the abutment and said end of the slot to create forces tending to draw the male member more tightly into the female member; and means on the male member for carrying a vibrator.

6. The invention defined in claim 5, in which: the slot is of such length that its other end projects to the other side of the abutment toward said first end of the channel so that the wedge member is removable from beneath the abutment for insertion through the slot at said other side of the abutment to engage with said other end of the

slot for creating forces tending to urge the male member out of the female member.

7. Connector means, comprising: a female member including an elongated socket element of C-shaped section made up of a back wall, opposite side walls and a pair of front walls spaced closely apart to provide a slit lengthwise of said element, said walls defining a channel of T-shaped section lengthwise of said element and opening at first and second opposite ends as well as outwardly via said slit, certain of said walls being interiorly shaped to converge toward said second end of the channel, said element having thereon a pair of abutments rigid respectively on the front walls and projecting outwardly respectively at opposite sides of the slit; an elongated male member of T-shaped section in which the bar of the T provides a web receivable by the channel via said first end and having tapered edges fitting the converging walls to tighten said male member in said female member, and the leg of the T providing a rib lengthwise of said male member and projecting outwardly through the slit and between and beyond the abutments, said rib having a slot lengthwise thereof and provided with opposite ends and one of said ends normally being spaced beyond the abutments; and a wedge member insertable transversely through the slot and beneath the abutments to engage between the abutments and said end of the slot to create forces tending to draw the male member more tightly into the female member.

8. The invention defined in claim 7, in which: the slot is of such length that its other end projects to the other side of the abutments toward said first end of the channel so that the wedge member is removable from beneath the abutments for insertion through the slot at said other side of the abutments to engage with said other end of the slot for creating forces tending to urge the male member out of the female member.

9. Connector means, comprising: a female member including an elongated channel opening at first and second opposite ends as well as outwardly at one side and having walls interiorly shaped to converge toward said second end of the channel, said member having rigid thereon an abutment projecting outwardly adjacent to said open side of the channel; an elongated male member receivable by the channel via said first end and having tapered edges fitting the converging walls to tighten said male member in said female member, and said male member including a portion projecting outwardly through the open side of the channel alongside the abutment and having a slot lengthwise thereof and provided with opposite ends and one of said ends normally being spaced beyond the abutment; and a wedge member insertable transversely through the slot and beneath the abutment to engage between the abutment and said end of the slot to create forces tending to draw the male member more tightly into the female member.

10. The invention defined in claim 9, in which: the slot is of such length that its other end projects to the other side of the abutment toward said first end of the channel so that the wedge member is removable from beneath the abutment for insertion through the slot at said other side of the abutment to engage with said other end of the slot for creating forces tending to urge the male member out of the female member.

11. Means for mounting a vibrator on a structure to be vibrated, comprising: a female member having means thereon for rigid affixation thereof to such structure and further including an elongated socket element of C-shaped section made up of a back wall, opposite side walls and a pair of front walls spaced closely apart to provide a slit lengthwise of said element, said walls defining a channel of T-shaped section lengthwise of said element and opening at first and second opposite ends as well as outwardly via said slit, certain of said walls being interiorly shaped to converge toward said second end of the channel, said element having thereon a pair of abutments rigid respectively on the front walls and projecting outwardly respectively at opposite sides of the slit; an elongated male member of T-shaped section in which the bar of the T provides a web receivable by the channel via said first end and having tapered edges fitting the converging walls to tighten said male member in said female member, and the leg of the T providing a rib lengthwise of said male member and projecting outwardly through the slit and between and beyond the abutments, said rib having a slot lengthwise thereof and provided with opposite ends and one of said ends normally being spaced beyond the abutments; and a wedge member insertable transversely through the slot and beneath the abutments to engage between the abutments and said end of the slot to create forces tending to draw the male member more tightly into the female member.

12. Means for mounting a vibrator on a structure to be vibrated, comprising: a female member having means thereon for rigid affixation thereof to such structure and further including an elongated socket element of C-shaped section made up of a back wall, opposite side walls and a pair of front walls spaced closely apart to provide a slit lengthwise of said element, said walls defining a channel of T-shaped section lengthwise of said element and opening at first and second opposite ends as well as outwardly via said slit, certain of said walls being interiorly shaped to converge toward said second end of the channel, said element having thereon a pair of abutments rigid respectively on the front walls and projecting outwardly respectively at oposite sides of the slit; an elongated male member of T-shaped section in which the bar of the T provides a web receivable by the channel via said first end and having tapered edges fitting the converging walls to tighten said male member in said female member, and the leg of the T providing a rib lengthwise of said male member and projecting outwardly through the slit and between and beyond the abutments, said rib having a pair of reaction portions spaced apart lengthwise thereof to lie respectively short of and beyond the abutment and spaced therefrom; and a wedge member transversely insertable selectively between the abutment and the reaction portion beyond the abutment, to create forces tending to tighten the male member in the female member, or between said abutment and the other reaction portion to create forces tending to urge the male member out of the female member.

13. Connector means, comprising: a female member having opposite ends and provided with a socket opening at at least one end and extending toward the other end and having interior wall portions; a male member insertable into and withdrawable from the socket and having external edge portions cooperative with the wall portions, certain of said portions being complementarily shaped to produce a tightening effect as the male member is forced into the socket; one of said members having slot means lying lengthwise along the line of insertion and withdrawal of the male member, said slot means having opposite ends spaced apart along said line; means on the other member including a pair of reaction portions spaced apart along said line at a lesser distance than the ends of the slot means and lying intermediate said ends so that a space is provided between one reaction portion and the next adjacent end of the slot means and another space is provided between the other reaction portion and the other end of the slot means; and a force-applying element insertable into one space to act between the associated reaction portion and slot means end to urge the male member into the socket and said element being also selectively insertable into the other space to act in the opposite direction between the other reaction portion and its associated slot means end to urge the male member out of the socket.

14. Connector means, comprising: a female member having opposite ends and provided with a socket opening

at at least one of said ends and extending toward the other end and having interior wall portions; a male member insertable into and withdrawable from said socket and having external edge portions cooperative with said wall portions, certain of said portions being complementarily shaped to produce a tightening effect as the male member is forced into the socket; first and second force-receiving parts rigid on one member and spaced apart along the line of insertion and withdrawal of the male member; third and fourth force-receiving parts rigid on the other member and spaced apart along said line at such spacing that when the male member is received in the socket the third part is spaced beyond the first part in the direction of insertion of the male member and the fourth part is spaced beyond the second part

in the direction of withdrawal of said male member; and a force-applying element insertable between the second and fourth parts to create a force urging the male member more tightly into the socket, and said element being selectively insertable between the first and third parts to create a force urging the male member out of the socket.

References Cited in the file of this patent

UNITED STATES PATENTS

635,842	Bush	Oct. 31, 1899
1,495,189	Mack	May 27, 1924
1,552,912	Colt	Sept. 8, 1925
2,726,432	Lemma	Dec. 13, 1955