

[54] TRENCH COMPACTOR

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[56] **References Cited**
UNITED STATES PATENTS

2,289,248	7/1942	Davis	94/48 X
2,791,437	5/1957	Knarzer	306/12 X
2,146,101	2/1939	Weber	94/48
2,861,287	11/1958	Scalf	306/13 X
2,419,719	4/1947	Kennedy	306/13 X
1,926,193	9/1933	Clark	94/48
2,397,537	4/1946	Coss	306/13

3,412,658	11/1968	Griffin	94/45 R
165,236	7/1875	Jenness	306/13
1,247,581	11/1917	Seitz	306/13 UX
2,150,326	3/1939	Jackson	94/48

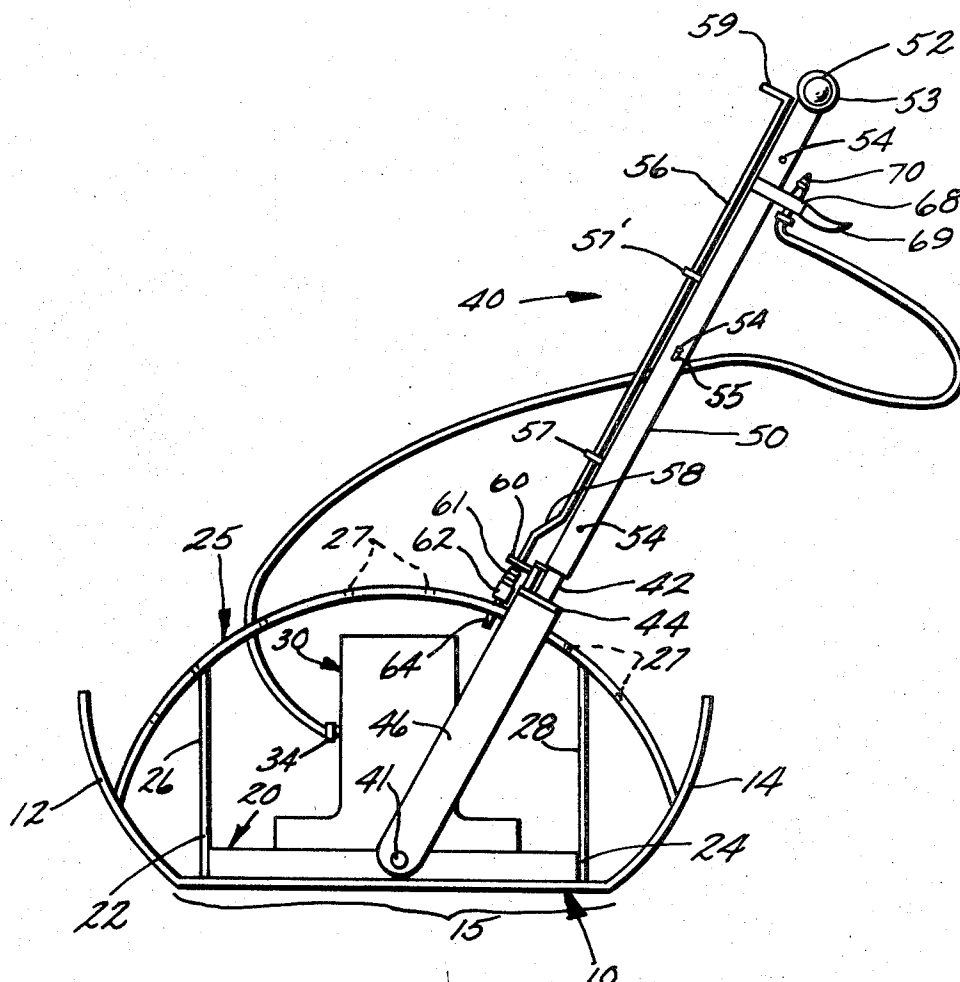
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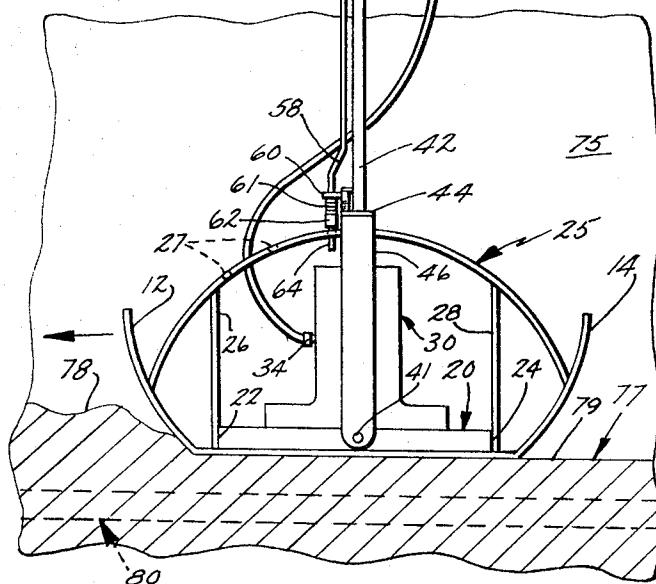
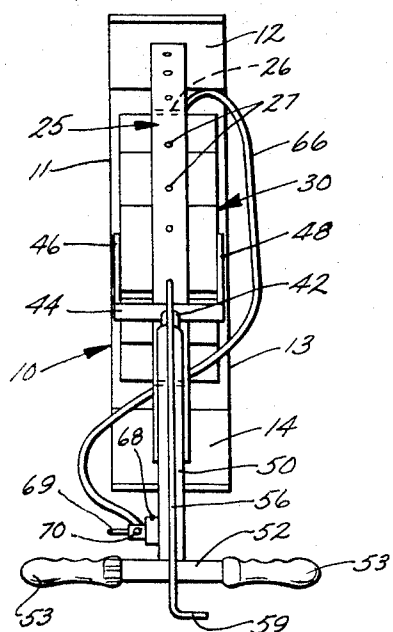
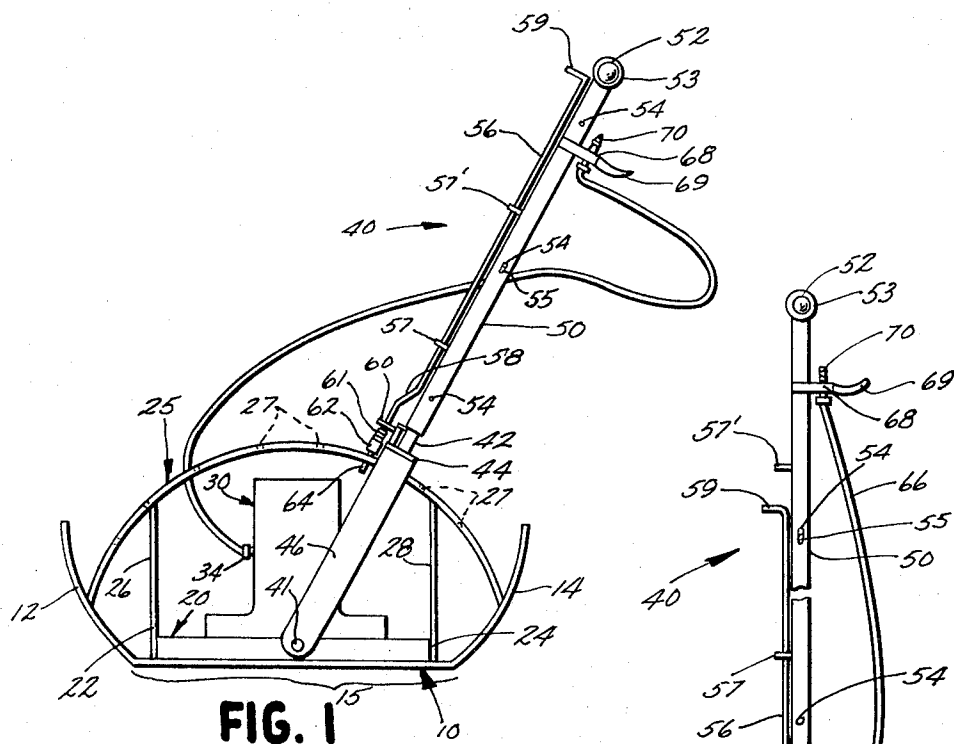
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[57] **ABSTRACT**

A compactor is provided for use in tamping earth or the like in a relatively narrow and deep trench such as used for burying telephone cables. The compactor includes a shoe portion having upwardly curved ends and a handle which is pivotally mounted to the compactor such that it can swing to either side of the vertical axis of the compactor to facilitate its operation in either direction along the trench. The handle is additionally collapsible and extendable such that it can be employed in trenches of varying depths. A vibrator mounted to the compactor to provide tamping forces can be of the pneumatic type which is controlled by the operator to vary the tamping action by means of a control valve mounted on the handle of the compactor.

4 Claims, 3 Drawing Figures





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TRENCH COMPACTOR

BACKGROUND OF THE INVENTION

The present invention relates to mechanically operated compactors and particularly to a compactor suitable for use in a relatively narrow trench.

When laying cables, conduits, or the like at the bottom of a relatively narrow and deep trench, it is relatively difficult to cover the cable and to repack the earth into the trench such that the ground level will be returned to the original contour existing before the cable was buried. Due to the narrowness of some trenches (usually 4 inches for buried telephone cables), conventional compacting devices such as described in U. S. Pat. Nos. 3,001,458; 2,209,656; 2,128,779; and 1,955,101 are either too large or lack the necessary flexibility of operation and therefore are impossible to use to compact the earth as the trench is being filled. If manual compacting means are employed, the compacting operation is exceedingly difficult and practically impossible if long trenches are involved. By employing a compactor embodying the present invention, however, the task of refilling and tamping a trench in which a cable or the like is buried is substantially eased.

It is therefore an object of the present invention to provide a mechanically driven compactor for use in a relatively narrow trench such that the compactor will fit into the trench for tamping earth used to cover a cable or the like laid at the bottom of the trench.

It is a further object of the present invention to provide a relatively narrow compactor which has upwardly curved end portions to facilitate the movement of the compactor in either direction along the trench.

It is an additional object of the invention to provide a compactor which has a handle which is pivotably mounted to the compactor such that it will swing to either side of the vertical axis of the compactor to facilitate movement of the compactor in either direction along the trench.

It is still an additional object of the present invention to provide a compactor having a handle which is collapsible or extendable to facilitate the use of the compactor in trenches which vary in depth.

SUMMARY OF THE INVENTION

A compactor embodying the present invention includes an elongated relatively narrow shoe having sides and upwardly extending end portions, and means rigidly mounted to the shoe for providing an oscillatory force to the shoe that as the compactor rests on a work surface an oscillatory tamping force is imparted to that surface. The compactor further includes handle means which is pivotably attached to the compactor such that the handle will swing to either side of the vertical axis of the compactor, the handle in the preferred embodiment being extendible or contractible to vary the length of the handle such that the compactor can be used with facility in trenches of varying depth and at various times in the filling-in process.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. 1 is a side view of a compactor embodying the present invention in which the handle of the compactor is in its contracted position;

FIG. 2 is a plan view of the compactor as shown in FIG. 1; and

FIG. 3 is a side view of a compactor embodying the present invention shown with the handle in its extended position and vertically oriented, the compactor being positioned in a trench shown in partial cutaway view in the figure.

Referring in detail to FIGS. 1 through 3, it is seen that the compactor comprises a shoe 10 having a left side 11, a right side 13, an upwardly curved front section 12 and an upwardly curved rear section 14. A center section 15 lies between the front section 12 and rear section 14.

A mounting plate 20 is rigidly attached to the central portion of the shoe by, for example, welding the plate to the shoe, and a vibrator 30 is mounted to the mounting plate 20 by means of bolts or other suitable mounting means not shown in the figures.

A relatively narrow curved band or strip 25 having a plurality of apertures 27 along its length extends from the front section 12 of the shoe to the rear section 14 of the shoe and is welded or otherwise rigidly attached to the shoe at these junctions. A front bracket 26 extends vertically from a front edge 22 of the mounting plate 20 to the band 25 and is rigidly attached to the band at their junction. A rear bracket 28, similarly, extends vertically from a rear edge 24 of the mounting plate 20 to the band 25 and is rigidly attached to the band at their junction. Thus, the band 25 is rigidly affixed to the shoe 10 by means of the mounting brackets and the connections to the front and rear sections of the shoe. In addition to providing means for locking the angular position of the handle 40 of the compactor as described infra, the radius 25 adds structural support for the upwardly curved end portions 12 and 14 of the shoe.

The compactor handle 40 comprises a first member 42 which is attached to a cross member 44 to which a left fork portion 46 and a right fork portion 48 are attached such that the combined structure (44, 46 and 48) forms a fork which is pivotably mounted to the mounting plate 20 by means of suitable mounting means such as bolts 41 (FIG. 1). The handle 40 further includes a second member 50 which is telescopically mounted over the first member 42. The second member 50 may be a hollow pipe or the like having an inner diameter somewhat greater than the outer diameter of the first member 42, thereby allowing the second member 50 to slide up and down on the first member 42. The second member 50 includes a cross bar 52 which may include handle grips 53. Member 42 and 50 each include a plurality of apertures 54 distributed along the length of each member. These apertures can be aligned at various extended positions of the handle to allow the handle to be locked at several different lengths by means of a locking pin 55 (FIG. 1) which is inserted through both members 42 and 50.

The handle 40 also includes a rod 56 having an end section 64 which protrudes through one of the apertures 27 in the band or strip 25 of the compactor thereby locking the handle 40 at a predetermined angle relative to the vertical axis of the compactor. It is seen that the apertures 27 are provided along the entire length of the radius such that the handle 40 can be locked into position at either side of the vertical axis of the compactor and at various angles with respect thereto. The rod 56 is slidably mounted to the second member 50 by means of guide brackets 57, 57' (FIGS. 1 and 3). The rod 56 includes a lever 59 which can be

employed to release the handle 40 from its locked angular position by retracting the end portion 64 of the rod 56 from one of the apertures 27 in the radius 25. A collar 62 (FIGS. 1 and 3) is provided on the rod 56 to which a spring 61 can abut to provide a spring loading force to hold the rod 56 into communication with an aperture 27, thereby locking the handle in position. The end of this spring 61 remote from the collar 62 abuts a mounting bracket 60 rigidly affixed to cross member 44. Bracket 60 includes an aperture through which the rod 56 can pass while simultaneously providing a mechanical stop for the spring 61. The rod 56 includes a curved portion 58 to facilitate its spring loaded mounting to the cross member 44 of the handle 40. It is seen that the upper guide means 57' is designed such that lever 59 will clear the guide 57' when the handle 40 is in its extended position as shown in FIG. 3.

A pneumatic hose 66 has one end coupled to the pneumatically operated pneumatically 30 by means of a coupling 34. The opposite end of hose 66 is coupled to a quick-opening control valve 68 which includes a control level 69 for varying the air flow to the vibrator 30 thereby varying the tamping forces developed by the compactor. The control valve 68 can be coupled to an external supply of pressurized air by means of a suitable fitting 70. Although the embodiment illustrated employed a pneumatically operated vibrator, an electrically operated vibrator or gasoline-driven vibrator of proper size could likewise be employed.

OPERATION

The compactor can be lowered into a trench 75 as shown in FIG. 3 such that the shoe contacts the bottom of the trench 77 which has been partially filled with earth or the like which is desired to be packed over a buried cable or conduit 80. The handle 40 can be adjusted to a height which facilitates the use of the compactor by the operator in a trench of a particular depth. The operator may likewise vary the angular position of the handle by pulling forward on the lever 59 to release the spring loaded rod 56 and swiveling the handle 50 to the desired angular position then releasing the lever 59 such that the end 64 of rod 56 slides in a desired aperture 27 in the radius strip 25. When it is desired to have the compactor remain in a stationary position to apply tamping forces for a continuous period of time at one location, the handle 40 can be locked in the vertical position as shown in FIG. 3. When it is desired to move the compactor along the trench as shown in FIG. 3 by the arrow indicating the desired direction of movement, the compactor handle can be tilted downwardly to the left (in FIG. 3) and can be pulled along the bottom of the trench to compact the earth 78 forward of the front edge 12 of the compactor to a relatively smooth surface as indicated by the earth 79 to the right of the end portion 14 of the compactor as shown in FIG. 3. Likewise it is possible to tilt the handle to the right and push the compactor along the trench.

It is noted that the forked portion of the handle 40 which comprises the members 44, 46, and 48 has a width that is substantially flush with the width of the shoe, i.e., the members 46 and 48 do not overhang the shoe. This design facilitates the positioning of the compactor in a relatively narrow trench. In one embodiment, the shoe had a width of 4 inches while the overall length of the shoe including the curved end portions

was 28 inches. The vibrator employed was a commercially available Cannon vibrator model No. 222.

To completely fill a trench, it may be necessary to make several passes with the compactor after each of which additional earth is added to fill in the trench. Thus after the trench has been compacted once, earth is back-filled in the trench, the handle is swiveled to the other side of the compactor and it is pulled the length of the trench to compact the newly added earth. Thus it is seen that it is not necessary to lift the compactor out of the trench during the filling and tamping process. The process is repeated until the ground level is reached and the original contour of the ground is restored. The upwardly curved ends of the compactor facilitate its operation since the ends provide a curved surface which intersects unpacked earth and allows the compactor to be easily moved along the length of the trench during use.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A compactor for use in tamping earth or the like in a relatively narrow trench, said compactor comprising, in combination: an elongated rectangular shoe comprising a flat center section and upwardly curved end sections, the width of said shoe being relatively narrow compared to its length; a vibrator rigidly mounted to said center section to provide an oscillating tamping force to said shoe; a handle comprising a fork portion having left and right fork members each having one end coupled to opposite ends of a cross member, the ends of said left and right fork members remote from said cross member being pivotally mounted to said shoe; a band extending from one of said end portions of said shoe to the other of said end portions of said shoe and rigidly affixed at each end, said band having an upper and lower surface, the cross member of said fork portion being spaced above the upper surface of said band regardless of the position of said fork portion relative said shoe; and said handle further comprising an elongated member having one end coupled to said fork portion and extending away from said shoe, and a second member slidably mounted to said first member and releasably engageable with selected portions of said band to selectively lock said handle in any one of a plurality of predetermined angular positions relative to the vertical axis of said compactor.

2. A compactor as defined in claim 1 wherein said band includes a plurality of means defining apertures distributed along the length of said band, said second member being a rod slidably mounted to the first member of said handle the lower end of which is releasably positionable in one of said apertures.

3. A compactor for use in tamping earth or the like, said compactor comprising, in combination: an elongated rectangular shoe comprising a flat center section and upwardly curved end sections, the width of said shoe being relatively narrow compared to its length; a vibrator rigidly mounted to said center section to provide an oscillating tamping force to said shoe; a handle comprising a fork portion having left and right fork members each having one end coupled to opposite ends of a cross member, the ends of said left and right fork members remote from said cross member being pivotally mounted to said shoe; said handle further comprising a first elongated member having one end coupled to said fork portion and extending away from

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said shoe, and a second member coaxially aligned with and slidably mounted to said first member to form a telescopic handle for said compactor, said shoe including means for rigidly fixing the angular position of said handle relative to a vertical axis of said compactor, said means including a band extending from one of said upwardly curved end sections to the other of said upwardly curved end sections and rigidly attached to said shoe at the junctions of said end sections with said shoe, said band including apertures distributed along the length of said band, said means including a releasable rod mounted to said handle, said rod having an

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end portion which is adapted to communicate with any one of said apertures in said band thereby fixing the position of said handle in one of a variety of angular positions relative to the vertical axis of said compactor, said rod extending from said handle intermediate said right and left fork members.

4. A compactor as defined in claim 3 wherein said vibrator is pneumatically operated and further includes an adjustable pneumatic valve mounted on said compactor such that the tamping forces provided by said compactor can be varied by adjusting said valve.

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