

March 10, 1964

H. P. NEPTUNE
CABLE LIFT PICK-UP UNIT

3,124,385

Filed June 11, 1962

2 Sheets-Sheet 1

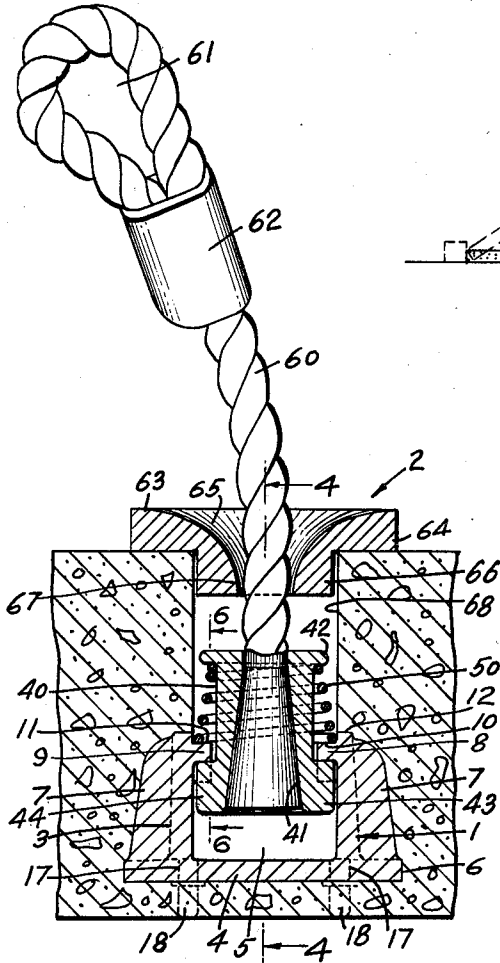


FIG. 2.

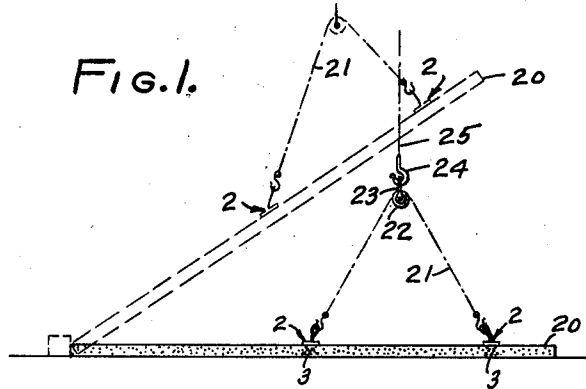


FIG. 1.

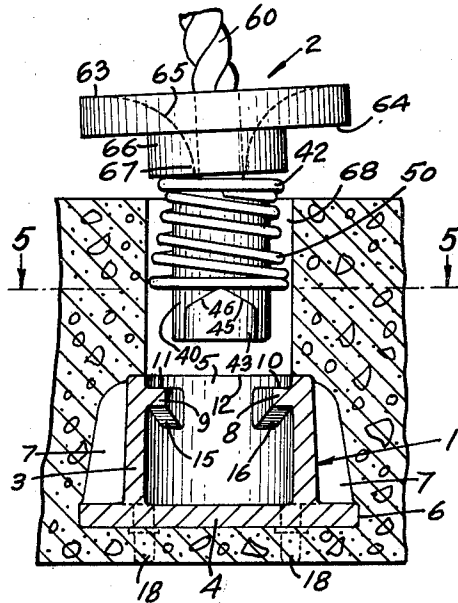


FIG. 3.

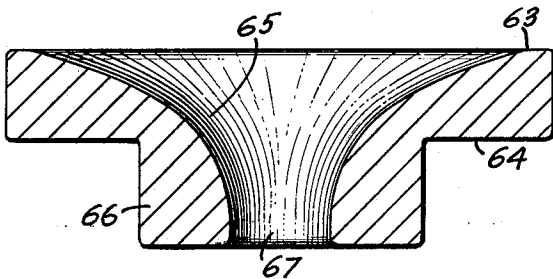


FIG. 8.

INVENTOR,
HERMAN P. NEPTUNE;
BY
Calvin Brown
ATTORNEY

March 10, 1964

H. P. NEPTUNE

3,124,385

CABLE LIFT PICK-UP UNIT

Filed June 11, 1962

2 Sheets-Sheet 2

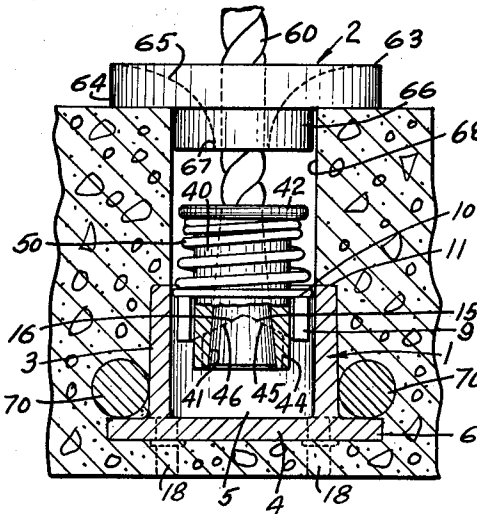


FIG. 4.

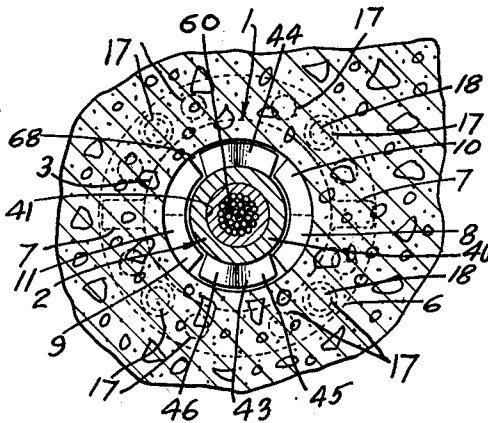


FIG. 5.

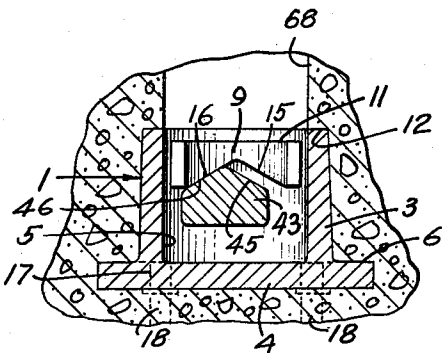


FIG. 6.

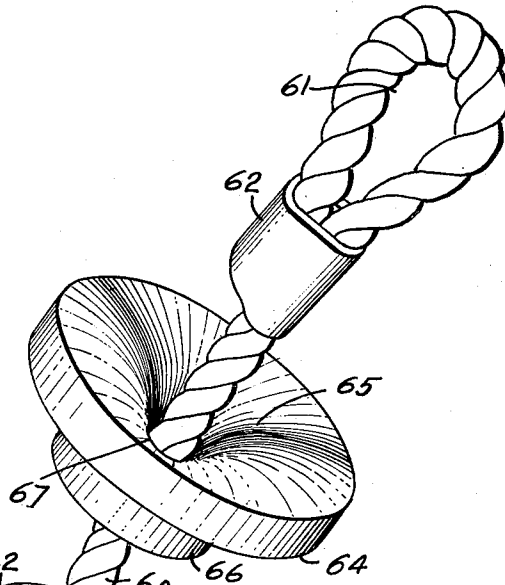


FIG. 7.

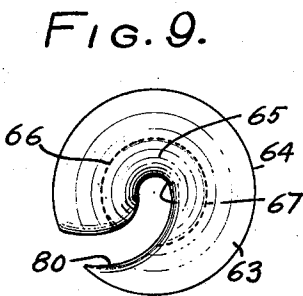
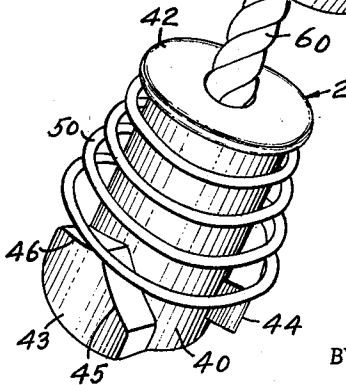


FIG. 9.



INVENTOR,
HERMAN P. NEPTUNE;

BY

Calvin Brown
ATTORNEY

1

3,124,385

CABLE LIFT PICK-UP UNIT

Herman P. Neptune, 2204 Moreno Drive,
Los Angeles 39, Calif.

Filed June 11, 1962, Ser. No. 201,675
6 Claims. (Cl. 294-89)

The present invention relates to a cable lift pick-up unit for concrete panels, slabs, beams, columns, and the like.

It is customary practice in building construction to prefabricate, at the site, concrete walls or panels by pouring neat concrete onto a mold surface and after curing to lift the panel or wall into position for a particular structure. It is common practice to provide anchor nuts, arranged in a predetermined pattern, in the concrete, to which anchor nuts are secured pick-up anchor bolts, suitable cables are secured to the pick-up bolts and a crane is employed for pulling on the cable and thereby raising or lifting a panel from a horizontal position to a vertical position. Such movement of the panel imposes a severe strain on the panel and if the pick-up bolts move within the openings leading to the anchor nuts the openings are enlarged and spalling of the concrete results sometimes causing the panel to drop.

An object of the present invention is to provide a preassembled cable lift pick-up unit which does not require tools for the installation or removal thereof from a panel. In place of providing different length pick-up bolts for panels, or sections, of various thicknesses, I provide a cable sling that fits all slab or panel thicknesses.

A further object of my invention is to provide a self locking pick-up unit which is fool proof in operation, easily operated without the use of tools, is accident proof, a time saver, of light weight, and reusable.

When it is realized that the use of a crane and crew for lifting and installing concrete panels or slabs entails an expenditure of seventy-five to one hundred dollars per hour, the necessity of providing a fool proof pick-up unit that saves time becomes a prime factor and the pick-up unit of the present invention does not require the screwing of a bolt within an anchor nut nor the removal of the bolt from the nut by extraneous tools. The construction of my device is such that all stresses are equalized to prevent damage to the concrete panel or slab when the panel is elevated by a crane or other means employing cable slings.

In the drawing:

FIGURE 1 is a side view of a concrete panel incorporating the pick-up unit of the invention with a cable sling for elevating the panel;

FIGURE 2 is a fragmentary, partially sectional view of the cable lift pick-up unit imbedded in a concrete slab or panel;

FIGURE 3 is a view similar to that of FIGURE 2, elements of the pick-up unit being separated or disconnected;

FIGURE 4 is a fragmentary sectional view on the line 4-4 of FIGURE 2;

FIGURE 5 is a fragmentary view on the line 5-5 of FIGURE 3;

FIGURE 6 is a fragmentary sectional view on the line 6-6 of FIGURE 2;

FIGURE 7 is a perspective view of certain elements of the pick-up unit;

FIGURE 8 is an enlarged, transverse sectional view of a pressure plate used in the practice of the invention; and,

FIGURE 9 is a plan view of a modified form of pressure plate.

Referring now to the drawings, and particularly to FIGURES 6 and 7, and wherein in FIGURE 6 the nu-

2

meral 1 refers to the anchor nut which is used in conjunction with the assembly 2 shown in FIGURE 7.

The anchor nut of the pick-up unit includes an annular side wall 3 secured to a base 4, the annular side wall providing a socket 5. The base 4 is greater diameter than the side wall 3 to provide a flange 6. To add strength to the anchor nut, ribs 7 extend between the periphery of the side wall 3 and the flange 6. Any number desired of the ribs may be provided, although two are shown in the drawings. Within the socket 5 of the side wall 3 are provided diametrically arranged lugs 8 and 9, which lugs lie in the same horizontal plane, as shown in FIGURES 2 and 3. The top of each lug as shown at 10 and 11, is spaced below the top 12 of the side wall 3. Both lugs are of arcuate concave polygonal form and conform to the curvature of the socket. The sides 15 and 16 are in the form of a re-entrant angle, the sides being of equal length. The flange 6 of the base 4 is provided with a series of transverse bores 17, certain of which receive pins 18 whereby the anchor nut may be elevated above the concrete pouring pad, the concrete thus surrounding the pins and lying beneath the base 4. Other of said bores 17 are for tie wires to secure the anchor blocks to reinforcement rods 70 during pouring of concrete.

I may provide a number of anchor nuts at different locations in the concrete slab, as shown in FIGURE 1, wherein the concrete slab is designated as 20, there being two anchor nuts 3 imbedded within the slab at different elevations thereof. Usually, the anchor nuts are adjacent the edges of the slab and in the construction shown, the opposite edge of the slab has two anchor nuts, a pick-up assembly 2 is provided for each anchor nut with a cable sling 21 interconnecting pairs of pick-up assemblies 2. The cable sling is passed over a sheave 22, the sheave having the usual bale 23 engaged by a hook 24, carried by a cable 25 which leads to the crane arm.

There is a cable sling 21 for the opposite side of the panel which sling is passed over a sheave the bale therefor being carried on the hook 24. Quite obviously, the number of cable slings and anchor bolts utilized together with pick-up assemblies will depend upon the size and weight of a particular panel.

The pick-up assembly 2 includes a stud 40 provided with an axial tapered bore 41, the top of the stud provided with a flange 42 while a pair of diametrically positioned lugs 43 and 44 are formed on the periphery of the stud adjacent the base thereof. The studs are arcuate convex polygons, the sides 45 and 46 being of the same length and forming an angle. It will be observed that the sides 45 and 46 of the lugs 43 and 44 are complementary to the sides 15 and 16 of the lugs 8 and 9 of the anchor nut. Each arcuate lug substands an arc of less than 90° in order that the lugs 43 and 44 may pass between the lugs 8 and 9, and upon a turning of the stud 40 have the sides 45 and 46 received within and engage the sides 15 and 16 of lugs 8 and 9. The stud 40 is surrounded by a spring 50 of spiral helical form, the small diameter end engaging the under surface of the flange 42 while the enlarged diameter end engages lugs 43 and 44 and particularly the apex portion for the sides 45 and 46. Thus when the stud is moved so as to enter the socket 5 of the anchor nut, the lugs 43 and 44 enter the ways between the lugs 8 and 9, the tops 10 and 11 of the lugs 8 and 9 engaging a base end of the spring to compress the spring in the manner shown in FIGURE 2, whereupon on turning or revolving stud 40, the lugs 43 and 44 engage the lugs 8 and 9, the angular sides camming the two sets of lugs together to provide what may be termed a spring loaded engagement between the lugs of the stud 40 and of the anchor nut. This assures that the lugs will be held in coengagement and without any fear of separation

after such engagement between the pick-up assembly 2 and the anchor nut.

The pick-up assembly, in addition to the stud and its associated parts just described, includes a steel cable 60, one end of which is received in the bore 41 of the stud 40 and held within said bore in the usual manner such as by separating the cable wires and securing the same within the socket by metal. The cable extends upwardly a selected distance and is looped at 61 with the end secured by means of a ferrule 62, or other means.

Carried by the cable between the loop and the stud 40 is a pressure plate 63. The pressure plate comprises an annulus having a top portion 64 provided with a bell mouth 65 and a reduced diameter base portion 66, the central opening 67 accommodating the cable 60. The pressure plate is adapted to overlie and have its base 66 received in the bore 68 which bore was previously formed in the concrete slab when the concrete was poured and which bore leads to the anchor nut. Thus the base portion 66 is received within the bore 68, as shown in FIGURE 2, while the top of the annulus overlies the bore and engages the top surface of the concrete slab or panel. It is the bell surface 65 that permits the cable 60 to move to different positions relative to said surface without imposing a sharp bending strain upon the concrete or the cable and effectively prevents any spalling of the concrete at the zone of the hole 68.

The operation, uses and advantages of my invention are as follows.

To form a concrete panel or slab, a pad is provided on which are placed anchor nuts interconnected to reinforcement rods 70, all arranged in a previously selected pattern. Suitable posts project from the anchor nuts to form holes 68 in the concrete. The concrete is then poured to a given thickness and allowed to cure. Thereafter, the posts which form the holes 68 may be removed, and the pick-up assembly, as shown in FIGURE 7, may be inserted through the holes 68 into the sockets of the anchor nut. As stated, the number of anchor nuts and pick-up assemblies will depend upon individual operators, the size and weight of the panels, and other engineering factors known in the art. The pick-up assemblies and particularly the lugs thereof, are detachably interlocked with the lugs of the anchor nuts and the pressure plates are brought into position so as to have the reduced diameter bases thereof 66 received in the holes 68 with the top portions 64 overlying the same. In some instances, it may be desired to place the pressure plates in position after the studs have been connected to the anchor nuts, in which instance pressure plates of the form shown in FIGURE 9, may be used, and wherein a curved slot 80 leads from the periphery of the pressure plate to the axial bore 67. This slot is of sufficient width to allow the cable 60 to enter the same for positioning the cable in the bore 67. The arcuate slot is utilized so that the cable will not escape from the bore 67 when the pressure plate is positioned in the bore 68.

It is apparent from the description given that the pick-up assembly is easily manipulated by hand without tools to engage the anchor nut. Whereas it is ordinary practice to provide different length pick-up bolts which are threaded to the anchor nuts, for different slab thicknesses with the present invention the cable 60 is of sufficient length to accommodate any slab thickness and hence only one length of cable is necessary. Movement of the cable 60 in any direction only forces the pressure plate into tight engagement with the concrete slab. At the present time various means are utilized for maintaining an anchor bolt to a screw threaded type anchor nut and to prevent bending of the anchor bolt when it is subjected to angular stress. The inventor has found that such devices, as a rule, are not satisfactory as such devices are generally of

cam form and tend to loosen when stress is imposed on the anchor bolt in one direction and to tighten when stress is imposed in a second direction, with the result that the concrete is often subjected to breakage and spalling. With my invention the cable 60 is permitted universal movement without shifting of the pick-up unit to equalize stresses in any direction that the cable pulls.

I claim:

1. A pick-up unit for concrete slabs, panels and the like, including: a nut imbedded in the concrete slab, the concrete slab formed with an access bore to the nut, a pick-up assembly comprising a stud for passage through the bore of the concrete and separate means for the stud and for the nut for detachably locking the stud and nut in working relationship, a cable connected to the stud and a pressure plate received in part within the bore of the concrete and overlying a surface of the concrete through which said cable is passed.

2. A pick-up unit for concrete slabs, panels and the like, including: a nut adapted to be imbedded in the concrete, the concrete slab formed with a hole leading to the nut from a surface of the concrete slab, said nut having an axial bore and provided with a pair of diametric lugs within the bore, a stud externally provided with a pair of lugs complementary in form to the lugs within the bore of the nut and the lugs of both the nut and the stud adapted to interlock upon rotation of the stud, a cable axially secured to the stud and resilient means surrounding the stud for engagement with the nut to constantly urge separation between the stud and the nut and to maintain the lugs thereof when co-engaging in working relationship.

3. The device of claim 2, and a pressure plate carried by the cable and having a top portion formed with a bell mouth and a base portion adapted to fit within the hole of the concrete leading to the nut whereby the cable follows the contour of the bell mouth when the pick-up unit is elevating a slab.

4. The device of claim 2, the lugs of the nut being in the form of a concave polygon, and the lugs of the stud being in the form of a convex polygon.

5. A pick-up unit for a concrete slab, and the like, including: a nut having an annular side wall and a flanged base, said side wall interiorly provided with a pair of diametric lugs, said nut adapted to be imbedded in the concrete slab, the slab being formed with a hole leading to the nut from a surface of the slab, a stud having a cylindrical surface, one end being provided with a flange and a pair of diametric lugs on the cylindrical surface, said lugs of the stud and of the nut being so formed as to interlock when the stud is inserted through the hole of the concrete slab into the nut, means between the flange of the stud and the lugs carried thereby for engagement with the lugs of the nut to constantly urge the stud in one direction and to maintain locking engagement between the lugs of the stud and of the nut, a cable secured to the stud and extending outwardly from the flanged end thereof, a pressure plate formed with a central opening through which the cable is passed, the pressure plate adapted to be in part received within the hole in the concrete and to overlie a surface of the concrete surrounding the hole.

6. The device as set forth in claim 5, the pressure plate provided on its top surface with a bell mouth whereby when the cable lifts the concrete slab, the cable follows the contour of the bell mouth.

References Cited in the file of this patent

UNITED STATES PATENTS

2,719,747	Layne	Oct. 4, 1955
2,886,370	Liebert	May 12, 1959