United States Patent

[11] 3,597,893

[72] Inventor **Abram N. Spanel**
344 Stockton St., Princeton, N.J. 08540

[21] Appl. No. **792,731**
[22] Filed **Jan. 21, 1969**
[45] Patented **Aug. 10, 1971**

[54] **CONCRETE INSERT APPARATUS**
5 Claims, 6 Drawing Figs.

[52] **U.S. Cl.** **52/707, 248/23**
[51] **Int. Cl.** **E04b 1/38, E04c 5/12**
[50] **Field of Search** ..... 52/69.8, 704—711; 248/23, 25

[56] **References Cited**

UNITED STATES PATENTS

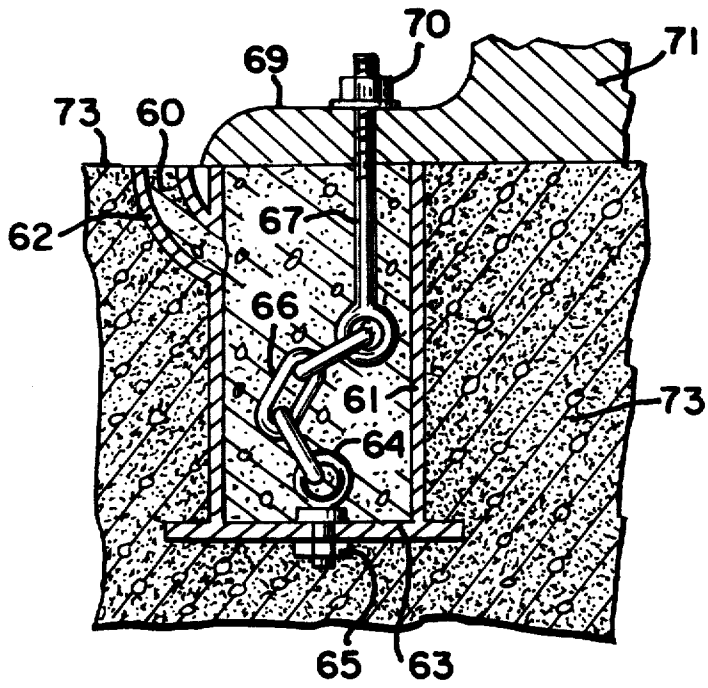
1,394,002	10/1921	Goldmsith	52/701
1,761,800	6/1930	Preis	52/709
2,952,947	9/1960	White	52/708
2,957,279	10/1960	McNair	52/701
3,293,811	12/1966	Rice	52/223
2,988,855	6/1961	Asfour et al.	52/704

FOREIGN PATENTS

147,644	1/1921	Great Britain	52/709
664,178	6/1963	Canada	52/127
470,296	8/1937	Great Britain	52/704
683,700	12/1952	Great Britain	52/708
330,106	12/1920	Germany	52/706

Primary Examiner—Frank L. Abbott
Assistant Examiner—James E. Ridgill, Jr.
Attorney—Arthur L. Plevy

ABSTRACT: A concrete insert device utilizes a longitudinal tubular member disposed about a given axis. A bolt member of a length less than the height of the tubular member is secured within the tubular member by coupling means. The coupling means permit positioning of the bolt in said tubular member along any axis intersecting an open face area bounded by the top periphery of the tubular member, which axes are parallel to the given axis. The coupling means further assures that the threaded portion of the bolt as desirably positioned, also extends about the height of the tubular member; to which threaded portion a machine member to be mounted on a concrete floor is thus secured.



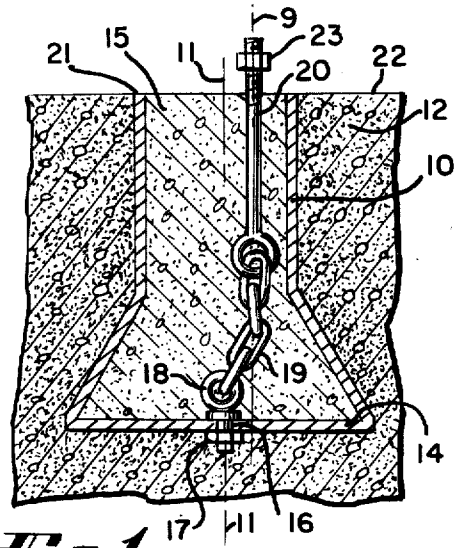


Fig. 1.

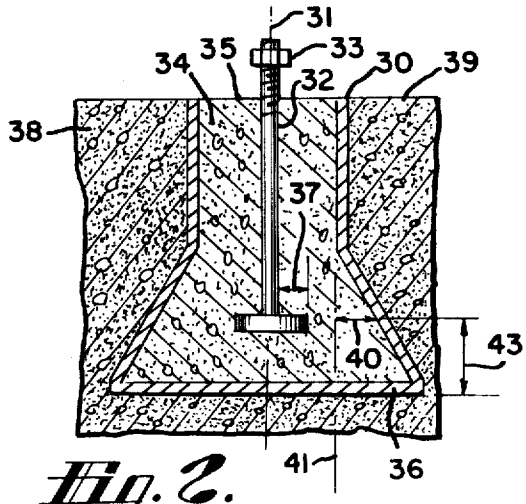


Fig. 2.

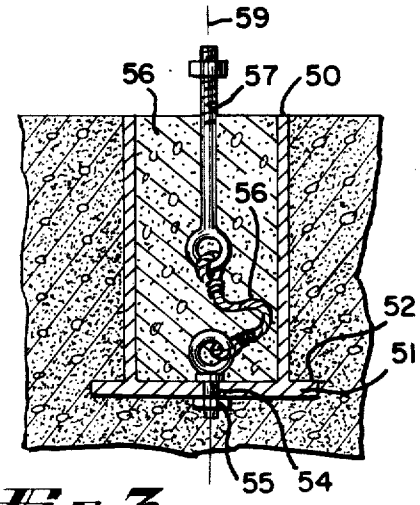


Fig. 3.

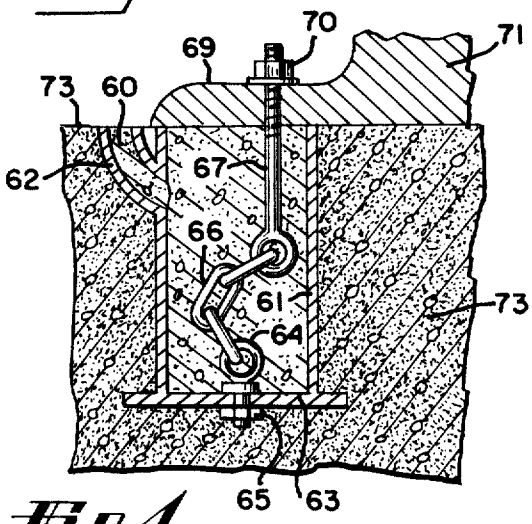


Fig. 4.

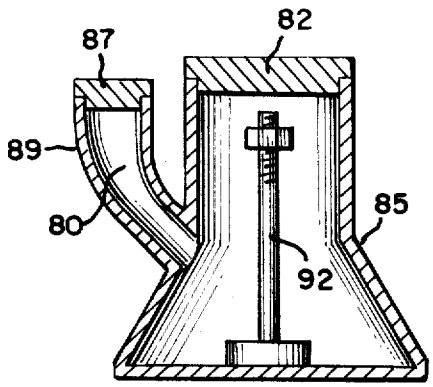


Fig. 5.

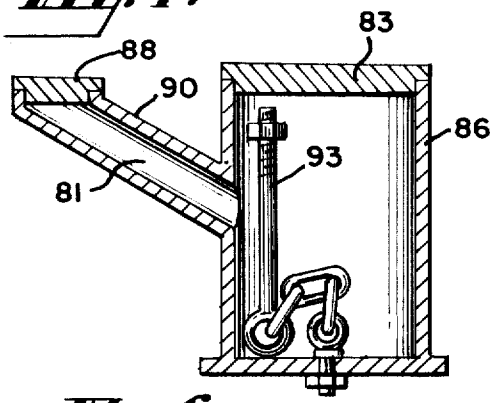


Fig. 6.

INVENTOR
ABRAM N. SPANEL

BY

ATTORNEY

CONCRETE INSERT APPARATUS

This invention relates to concrete insert apparatus, in general, and more particularly to such devices possessing full adjustability and therefore the capability of assuring registration with an object to be fixedly mounted on a concrete floor.

The prior art discloses a multiplicity of insert or anchoring devices for concrete. Certain early devices utilized, possessed disadvantages, as once embedded in the concrete they were not capable of being easily adjusted thereby consuming valuable time and therefore, if care and precision were not taken in so embedding these devices, they would not register with the holes of the object to be secured to the concrete floor or wall; and to achieve registration often became a costly task,.

Cognizant of this problem, other insert devices permitted adjustability over limited regions. Such devices suffered in that their adjustment factors were relatively small and hence time-consuming care again had to be exercised in embedding such devices. Certain of these devices employed capative nuts with complicated restraining members, difficult and costly to fabricate. Another disadvantage of such devices was the susceptibility of jamming the device if concrete were accidentally poured within the insert's cavity during the embedding process.

Certain other adjustable devices maintained or permitted the securing means enclosed within the inset to be finally positioned at some angle with respect to the concrete floor or surface, making it difficult to attach the machine or other device thereto.

Still certain other prior art devices as inserted in the concrete protruded from the floor surface and hence if heavy machinery were moved or pushed along the floor, such devices would naturally interfere with the consequent motion.

It is therefore an object of the present invention to provide improved concrete insert apparatus capable of being easily adjusted, offering no major obstacles protruding from the concrete floor, made in simple and economical configurations.

These and other objects of the present invention employ a longitudinally tubular member disposed about a given axis and having an open faced end; a bolt member of a length less then the length of the longitudinal member has a threaded end and a head end portion, and is coupled within the tubular member to permit positioning of the bolt along any one of a plurality of axes parallel to the given axis and intersecting the area bounded by the open faced end of the tubular member; while further permitting the threaded end of the bolt member to extend beyond the surface of the concrete after initial adjustment of the bolt has been made corresponding to any desired position, while finally maintaining the bolt completely below the concrete floor.

Other objects and advantages will become apparent in the ensuing specification and appended drawings, in which:

FIG. 1 is a vertical sectional view of a concrete insert according to this invention.

FIG. 2 is a vertical sectional view of an alternate embodiment.

FIG. 3 is a vertical sectional view of a further embodiment.

FIG. 4 is a vertical sectional view of another embodiment further showing a machine device secured to a concrete floor utilizing the embodiment.

FIG. 5 is a sectional view of a further embodiment.

FIG. 6 is a sectional view of still a further embodiment.

Referring to FIG. 1 a longitudinal tubular member 10 is disposed about a given axis 11 and is shown embedded in a concrete slab 12. Member 10 is shown as having a frustoconical cross section, but other configurations as rectangular, cylindrical and so on, would suffice. The frustoconical section has advantages in that it offers resistance to forces directed upwards and along axis 11 from pulling the insert out of the concrete slab 12.

The bottom face 14 is closed while a front face 15 is opened. The bottom face 14 has a hole or aperture 16 therein,

oriented about axis 11. An eyebolt 18, or other suitable fastening device is inserted through the hole in the face 15 and secured to the tubular member by means of a nut 17 or other locking device. The eye end of the bolt 18 is coupled to a chain member 19, having first and last links. The chain 19 may be fabricated from a strong constructrial material as steel, iron, etc., as is the eyebolt 16.

A bolt member 20 of a length less than the length of the tubular member 10 is positioned within the hollow of member 10, and has a threaded end and a head end, which has an eye configuration. The last link of the chain 19 encircles, and therefore couples the eye of the bolt or the head end, to the tubular member 10 via the chain 19.

FIG. 1 shows a grouting 21 oriented within the hollow enclosed by the tubular member 10 and serves to maintain any desired position of the bolt 20 within the member 10.

Before the insertion of the grout material 21, the bolt 20, is loosely positioned as indicated above. The length of the chain 19 plus the length of the bolt 20, enable the threaded end of the bolt to move in a vertical direction along axis 11, to permit the threaded end of the bolt 20 to be positioned above the concrete floor 22. The length of the chain 19 also permits positional variation of the bolt 20 along all axes parallel to axis 11, for example as axis 16. Such axes include all axes which are parallel to axis 11 and intersect the area bounded by the open face 15.

The assembly comprising elements 10, 16, 20 is first embedded in the concrete slab 12 in accordance with predetermined dimensions of a machine member to be secured to the concrete floor. The assembly may be capped during this process to avoid cement or concrete from entering the cavity of tubular member 10. Any cap is convenient as the bolt 20 is within the hollow confines of member 10 and does not protrude therefrom.

The machine, to be secured, may have two or more bolt-accomodating holes located at different points on the periphery of its base, each of which is to be associated with an insert device, as shown in FIG. 1, and located at an approximate position of the floor. The machine is then pushed or slid into place, conveniently, as the insert devices offer no protrusions above the floor and hence do not offer obstacles. When the machine is so positioned, the workman reaches into the hollow of tubular member 10 with a long-nosed plier on other suitable device and captures the loosely positioned bolt 20. He then inserts the bolt through the corresponding accommodating hole in the base assembly of the machine and fastens a nut 23 thereto. After all bolts, as 20, of the devices are thusly secured to the machine base, he fills the hollow recesses with a suitable grout or epoxy material 21 by means of any exposed area of the open face 15, not overlapped by the machine leg. After the grout material hardens it fixedly couples the chain 19, the bolt within 6 and to the tubular member 10. The frustoconical shape shown serves to further lock the grout material and therefore the member 10 to the concrete when a force is applied upwards along axis 11.

FIG. 2 shows a sectional view of an alternate embodiment. A longitudinal tubular member 30 is disposed about an axis 31. The member 30 is of a frustoconical configuration and may be fabricated from steel or some other suitable constructrial material. A bolt member 32 has a threaded end and a head end. The head end of the bolt 32 is of a relatively larger dimension when compared to the dimensions of the shaft of the threaded portion of bolt 32. The bolt 32, as shown, before insertion of the grout 34, is simple placed within the hollow confines of the tubular member 30, and does not protrude therefrom, as the length of bolt 32 is less than the height of the tubular member 30. After the member 30 is embedded in a concrete slab 38, and the machine to be secured, with its accommodating hole, is positioned; the workman captures the bolt and raises the bolt so that the threaded portion protrudes through the top opening face 34 and through the accommodating hole in the machine. The nut 33 is then coupled to the threaded end of the bolt 32, which is restrained from turn-

ing by the workman. The bolt 32, as positioned is therefore on an axis parallel to axis 11 and substantially perpendicular to the plane containing the concrete floor 39. The grout is then poured into the hollow of member 10, through the open faced end 35 and allowed to harden, thus fixing the bolt 32 in the operational position.

The bolt 32, as can be seen, can be positioned before the insertion of the grout along any axis parallel to the axis 11, while permitting the threaded end to protrude above the open face 35 or above the concrete floor 39. The head of the bolt 30 is dimensioned so that the distance 37 from the center or axis of the threaded shaft to the end of the side of the bolt head is approximately equal to that distance 40, between a line 41 drawn parallel to axis 11 from the inside surface of the tubular member 10 before the frustoconical section, to the sloping wall of the frustoconical section at a distance 43 above the base 36.

FIG. 3 shows a longitudinal tubular member 50, which may be of a cylindrical or rectangular configuration having a base 51 with a surrounding flange 52. A hole 54 in the approximate geometrical center of the base 51, accommodates a screw or bolt member 55 which has one end coupled to a expandable or flexible steel cable 56. The other end of cable 56 is fixedly coupled to the head end of a bolt 57 having a threaded portion at the other end thereof.

It can be seen from the figure that positional variation is the same as that shown above, with the cable 51 for example, replacing the chain member 19 of FIG. 1. The grouting 56 serves to maintain and couple the bolt 57, the cable 56 to the member 50 in the desired position parallel to the axis 59.

FIG. 4 shows a sectional view of an anchoring device having a grout accommodating passageway 60 contiguous with the hollow enclosed by a longitudinal tubular member 61.

Briefly, longitudinal member 61 has a base 63, an eye bolt 64 through a hole in the base and secured to the base by means of a nut 65.

A chain 66 is coupled between the eye aperture of bolt 64 and the eye of the anchoring bolt 67. As such the elements shown are similar to those shown in FIG. 1 and are capable of all the easy positional and adjustability aspects of the device described in conjunction therewith.

The difference being the passageway, 60, which communicates with the hollow enclosed by tubular member 61.

In certain applications the machine leg 69 may be of such large dimensions as to cover the open face of the tubular member. This presents no problem in securing the bolt 67 thereto, as the machine 71 may be lifted slightly above the insert and the bolts thus inserted and secured with an appropriate nut as 70. The machine 71 is thusly located, but not yet rigidly fixed to the concrete floor. However, the machine when lowered to the concrete floor 73, has the legs 69, thereof, covering the open face area and hence one cannot insert the grout.

For such latter applications a tubular member 62 has a passageway 60 therein communicating at one end with the hollow of the tubular member 61 via a hole 64 drilled in the side of the member 61, and terminating at the other end at an open face lying in the same plane as the open face of tubular member 61. The member 62 may be so secured by any suitable means such as threading, force fit and so, with the hole 64 in member 61.

The entire assembly as shown is embedded in the concrete slab 73. After securing the machine 71 grout is poured into the top open face of member 62 and enters the hollow cavity as shown. The location of the hole 64 is such as to ensure that the grout as poured will fixedly couple the chain 66 and the bolt 67 to the tubular member 61. The member 62 as embedded in the concrete offers further resistance to a force in a direction tending to pull the entire assembly from the concrete slab 73.

FIG. 5 and FIG. 6 show sectional vertical views of alternate embodiments of concrete inserts according to this invention, having grout accommodating members 85 and 86 with passageways 80 and 81 respectively, further showing cap covers 82 and 83 for the respective open face ends of longitudinal tubular members 85 and 86, and cap covers 87 and 88 for the open face ends of the grout passageway members 89 and 90. Such units as shown in FIGS. 5 and 6, would be embedded in the concrete with the cover caps shown therein in place. After setting of the concrete all the caps shown would be removed. The bolts 92 and 93 contained therein positioned appropriately and thence secured by suitable nuts to the accommodating holes in the machine base. At which step in the procedure the grout would be poured into the hollow of the tubular members 85 and 86, via the passageways 80 and 81, to secure and coupled the entire assembly as described above.

I claim:

1. A concrete insert apparatus comprising,
   a. a longitudinal tubular member disposed about a given axis and having an open face end,
   b. a bolt member having a threaded end and a head end, and of a predetermined length,
   c. an extendable member coupling said head end of said bolt member to said longitudinal tubular member within said tubular member, said extendable member being of a length to permit said threaded end of said bolt to move substantially out of said open face while further permitting said bolt to assume any one of a plurality of positions occupied by the plurality of axes parallel to said given axis and contained within the boundaries of said open face end.
   d. a grouting material disposed within the internal cavity of said tubular member for rigidly securing said extendable member within said tubular member while rigidly maintaining said bolt member in a desired one of said plurality of positions.

2. The concrete insert apparatus according to claim 2 further comprising,
   a. a second tubular member of a smaller diameter than said first and having open top and bottom ends, said bottom end coacting with the internal cavity of said tubular member and said top end being positioned in the same plane as said top open face of said longitudinal member, said tubular member serving as a grout passageway to permit grout to be introduced within said cavity when said top open face is undesirably blocked.

3. The concrete insert apparatus according to claim 1, wherein said bolt member comprises an eyebolt having an eye head end encircled by said extendable member.

4. The concrete insert apparatus according to claim 3 wherein said extendable member comprises a chain including a first and a last link, said last link encircling said eye of said bolt member and said first link coupled to said tubular member.

5. The concrete insert apparatus according to claim 3 wherein said extendable member comprises a coiled steel cable, having one end fixedly encircling said eye of said bolt member and said other end coupled to said tubular member.

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,597,893 Dated August 10, 1971

Inventor(s) ABRAM N. SPANEL

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 4, line 36, delete "." and insert -- , --. Column 4, line 42, "according to Claim 2" should read -- according to Claim 1 --. Column 2, line 44, "on" should read -- or --. Column 2, line 54, delete the numeral "6".

Signed and sealed this 28th day of March 1972.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents

I PO-1050 (10-69)

USCOMM-DC 60376-P69
* U.S. GOVERNMENT PRINTING OFFICE : 1969 O—366-334