Jan. 7, 1969 P. D. COURTOIS ET AL 3,420,014

ANCHOR INSERT AND PICK-UP UNIT THEREFOR

Original Filed Oct. 19, 1965 Sheet 1 of 3

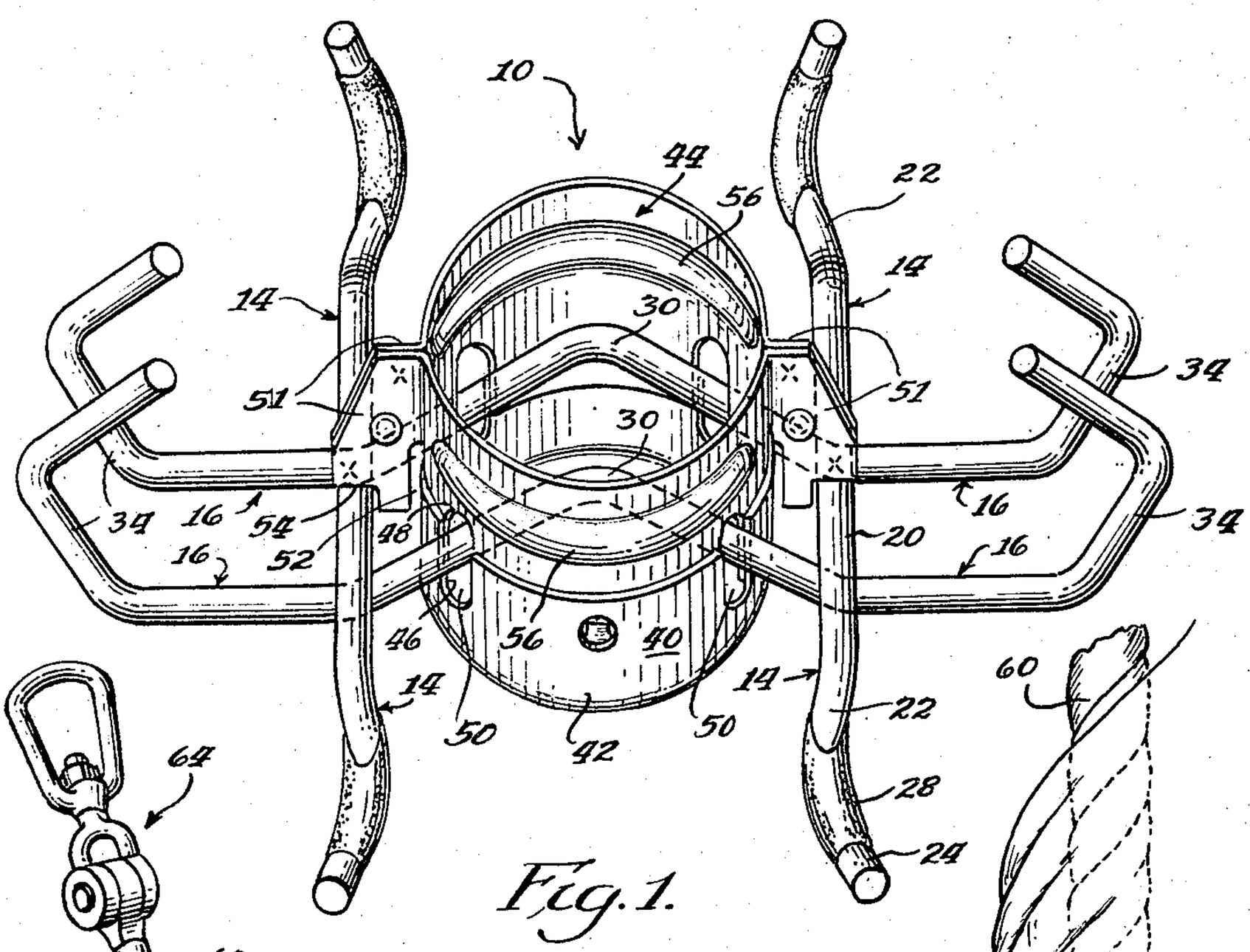

Fig. 1.

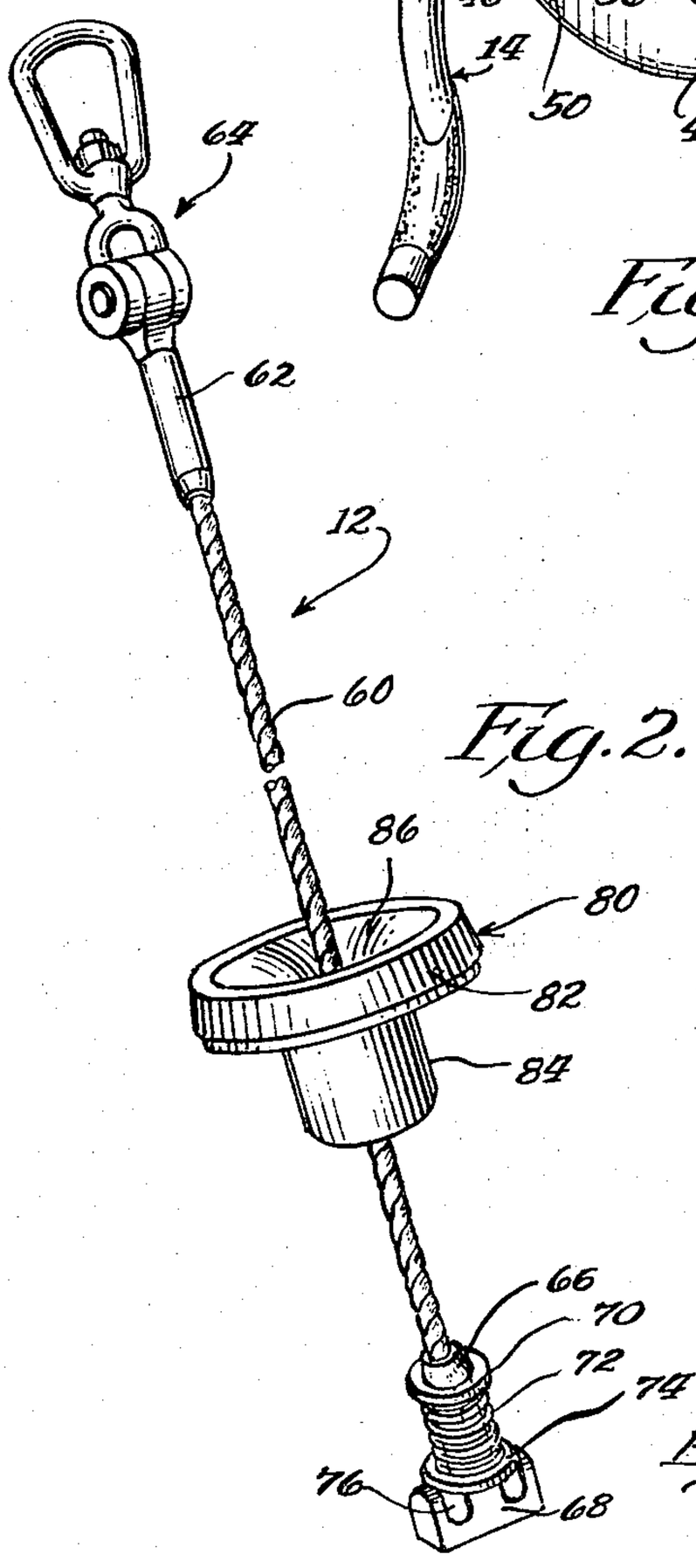

Fig. 2.

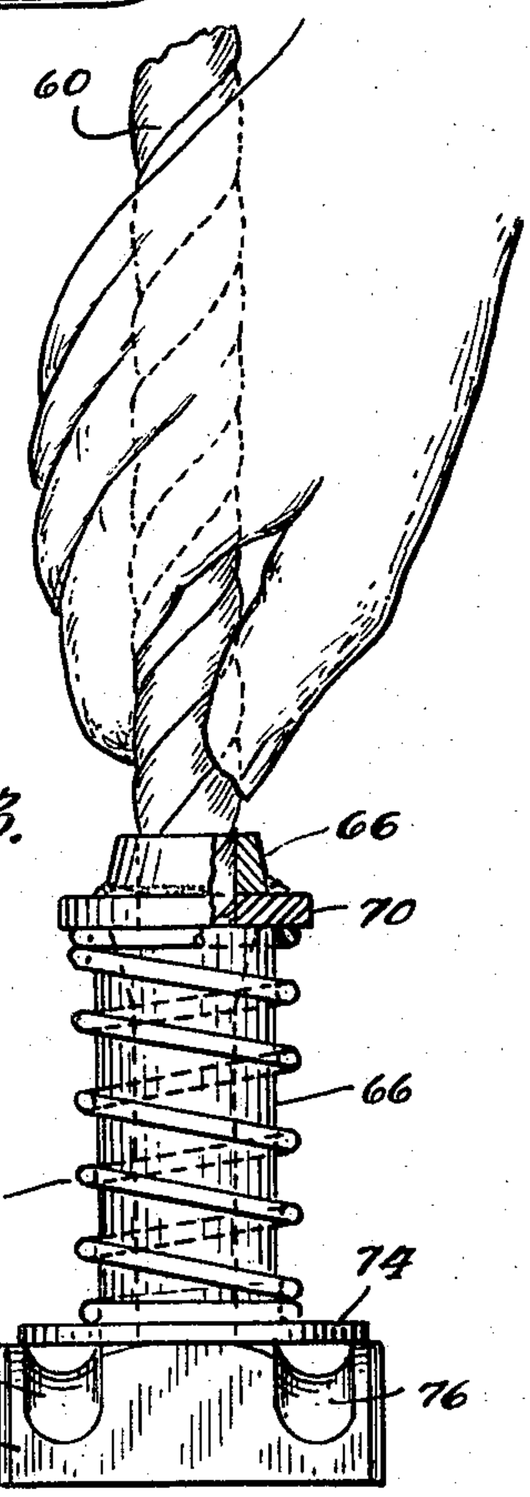

Fig. 3.

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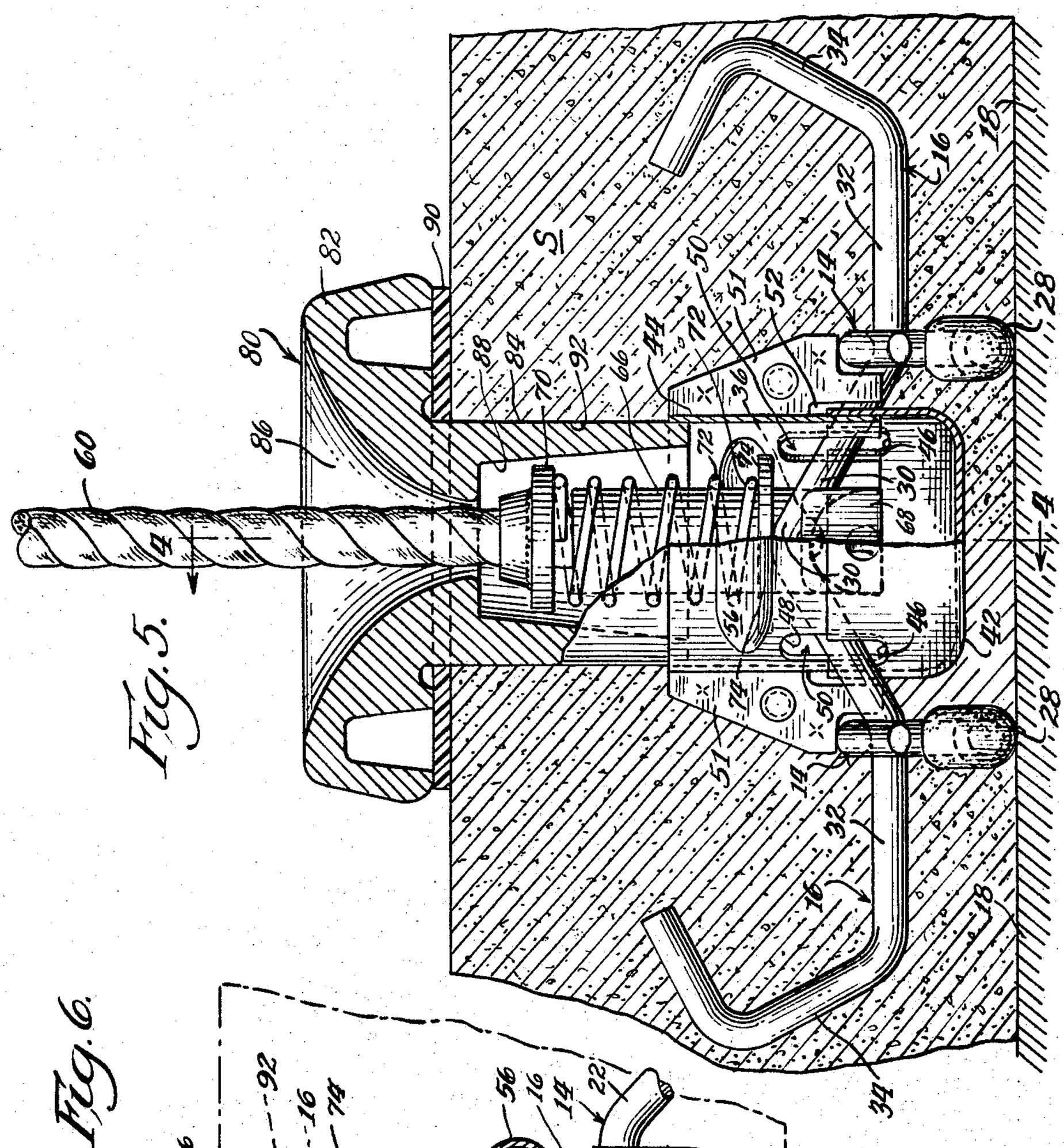
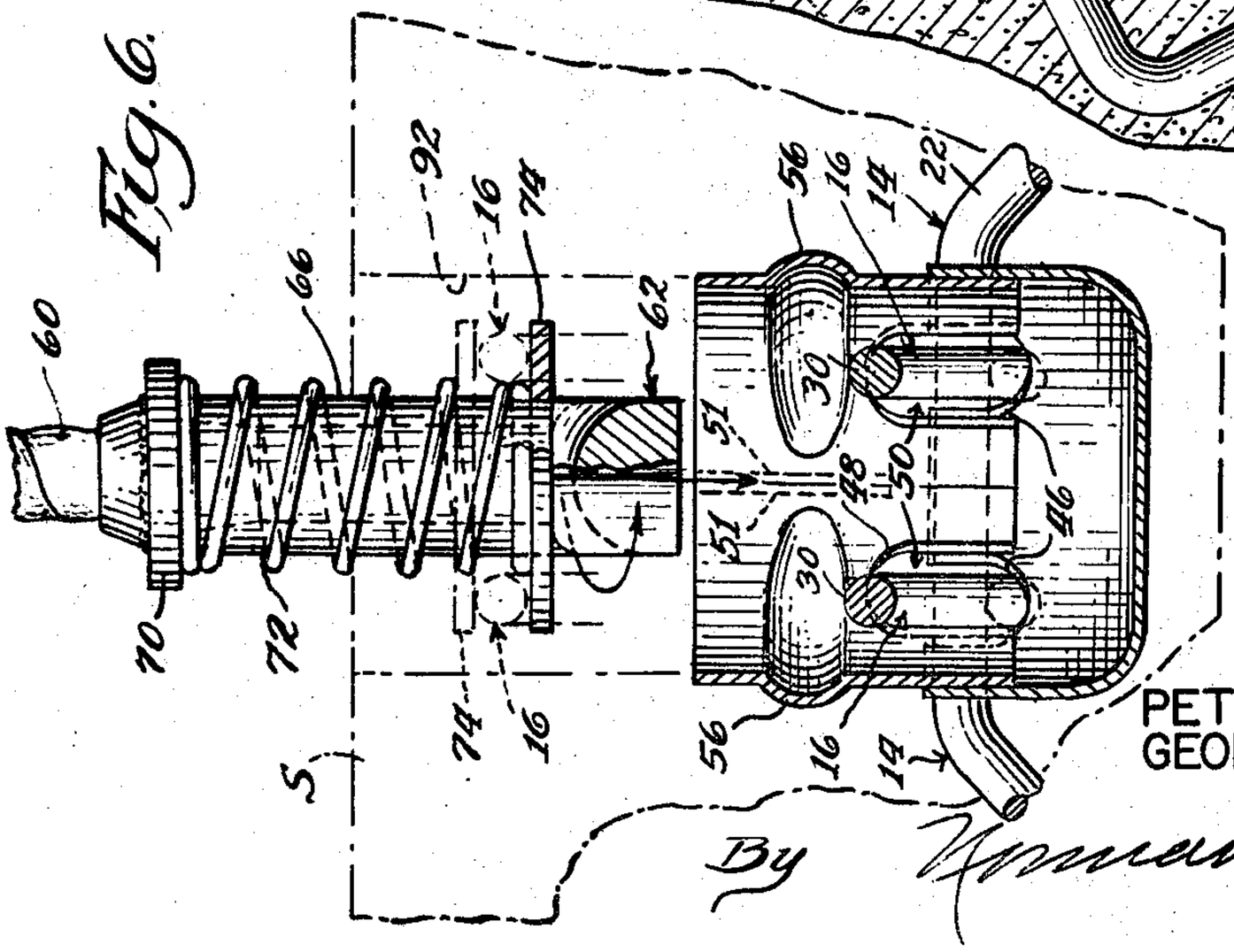
Original Filed Oct. 19, 1965 Sheet 2 of 3





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ANCHOR INSERT AND PICK-UP UNIT THEREFOR

Original Filed Oct. 19, 1965 Sheet 3 of 3

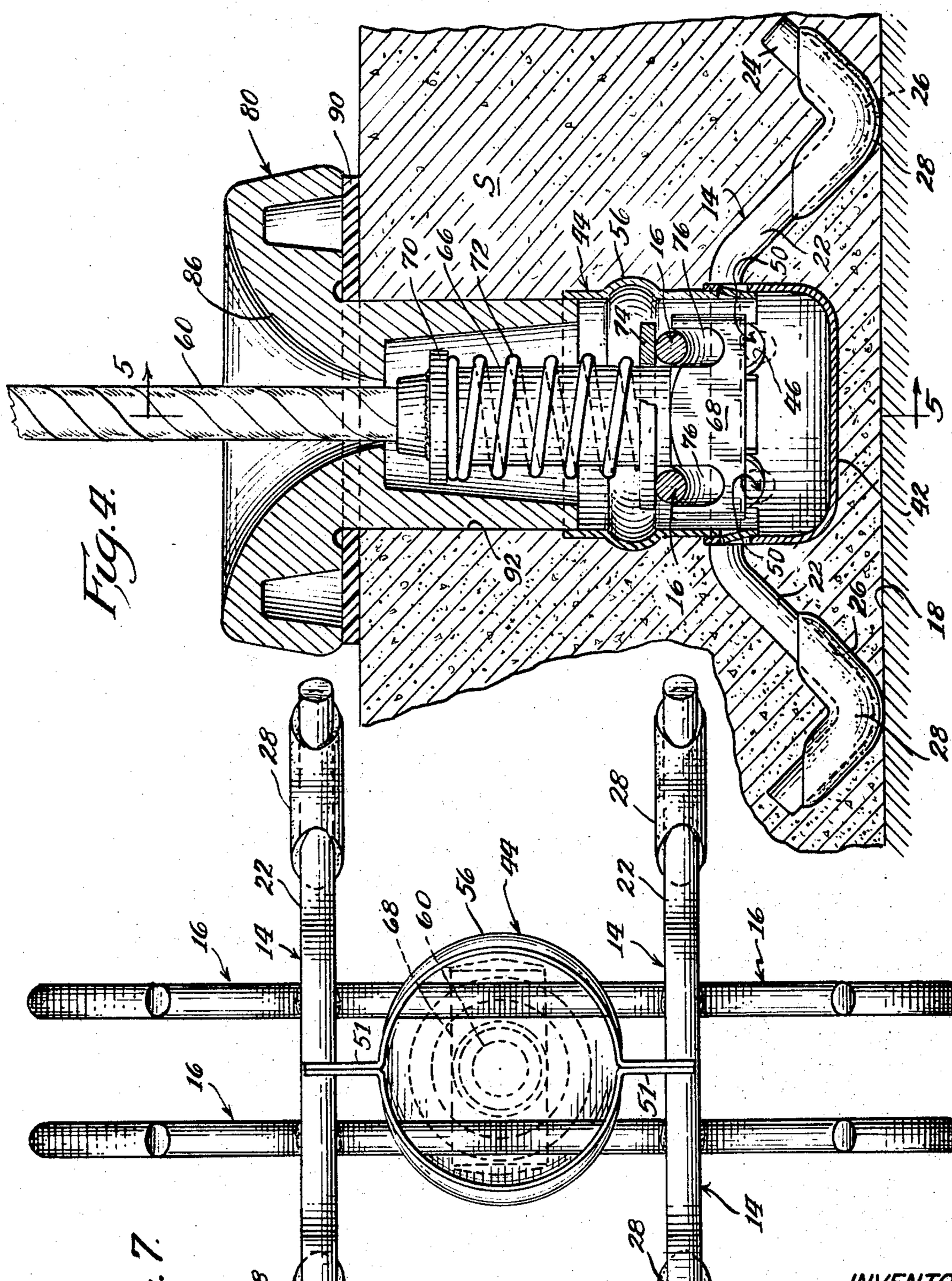

Fig. 4.

Fig. 7.

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ANCHOR INSERT AND PICK-UP UNIT THEREFOR

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Continuation of application Ser. No. 500,491, Oct. 19, 1965. This application Oct. 5, 1967, Ser. No. 690,037
U.S. Cl. 52—173 14 Claims
Int. Cl. E04g *21/14;* B66c *1/00*

This application is a continuation of original U.S. patent application Ser. No. 500,491, filed on Oct. 19, 1965, now abandoned, and entitled, "Anchor Insert and Cable Pick-Up Unit Therefor."

The improved anchor insert and pick-up unit comprising the present invention is designed for use primarily in connection with a concrete wall slab of the tilt-up variety, the anchor insert being adapted to be embedded in one corner portion of the wall slab during formation of the latter and serving, in connection with a similar anchor insert in an adjacent corner portion of the slab and after hardening of the concrete, as a medium whereby the slab may be detachably connected to a crane or similar hoisting mechanism to the end that the slab may be first raised in a horizontal position and then tilted into a vertical position next to a concrete floor slab in connection with the erection of a building or other concrete structure. The counterpart pick-up unit of the assembly is designed for cooperation with the anchor insert and consists of a short length of cable having a hook-receiving loop at one end and a T-head at the other end thereof. The T-head is selectively receivable in any of the anchor inserts that are embedded in a concrete slab to be hoisted and tilted and, by a twisting action on the part of the operator, is caused to move into releasable interlocking relationship with the insert.

The novelty of the present invention resides in the use of heavy gauge rod stock as a major component of the anchor insert, the rod lengths that are associated with the insert constituting a uniformly and widely distributed grid for embedment in the associated concrete slab, as well as providing supporting legs for the insert so that the latter may rest in properly oriented position on a foundation surface prior to a concrete pouring operation. The rod lengths further cooperate in a novel manner with the aforementioned T-head of the pick-up unit to provide the aforementioned releasable interlock between the two parts of the assembly. Another feature of the present invention resides in the provision of a novel shield member which has a two-fold purpose in that it serves to establish a concavity in the concrete and also serves to exclude concrete from such concavity so that there will be no interference of concrete with proper functioning of the interlock connection when the pick-up unit is applied to the anchor insert of the assembly.

The provision of an anchor insert and pick-up unit such as has briefly been outlined above, being among the principal objects of the invention, another and important object is to provide a novel reaction collar for the pick-up unit for assimilating the lateral thrust of the cable portion of the unit at such time as a hoisting operation is in progress.

The provision of an anchor insert which is comprised substantially entirely of sheet metal and rod stock and, therefore, may be economically manufactured; one which is capable of ease of assembly; one which, after embedment and concrete hardening operations have taken place, presents at the top and bottom surfaces of the associated concrete slab no metal areas which otherwise would be subject to rusting; one which is rugged and durable and, therefore, will withstand rough usage; and one which is otherwise well adapted to perform the services required of it, are further desirable features which have been borne in mind in the production and development of the present invention.

Other objects and advantages of the invention, not at this time enumerated will readily suggest themselves as the nature of the invention is better understood.

In the accompanying three sheets of drawings forming a part of this specification, one illustrative embodiment of the invention is shown.

In these drawings:

FIG. 1 is a perspective view of an anchor insert constructed according to the present invention, such insert being in its assembled or fully constructed condition;

FIG. 2 is a perspective view of the counterpart pick-up unit which is exclusively designed for cooperation with the anchor insert of FIG. 1;

FIG. 3 is an enlarged side elevational view of the lower region of the cable pick-up unit, that is, the end having the T-head;

FIG. 4 is a sectional view taken substantially centrally and vertically through the assembled anchor insert and cable pick-up unit, such view showing the anchor insert operatively embedded and installed in a concrete wall slab;

FIG. 5 is a vertical sectional view taken on the line **5—5** of FIG. 4;

FIG. 6 is an exploded view, somewhat schematic in its representation, illustrating the anchor insert and the cable pick-up unit in the positions which they assume immediately prior to effecting the interlock operation between such two parts; and

FIG. 7 is a top plan view of the anchor insert, illustrating, by a dotted line disclosure, its manner of cooperation with the cable pick-up unit.

Referring now to the drawings in detail and in particular to FIG. 1, the anchor insert that is disclosed therein is designated in its entirety by the reference numeral **10** and is designed for embedment in a tilt-up type concrete wall slab S and to form with similar inserts a medium whereby the slab may be detachably connected to a crane or similar overhead hoisting mechanism to the end that it may be raised and then tilted into a vertical position adjacent to a concrete floor slab in connection with the construction of a building or other concrete structure. Toward this end, the anchor insert **10** is designed for releasable cooperation with a cable pick-up device such as is shown in FIG. 2 and designated in its entirety by the reference numeral **12**.

The anchor insert **10** involves in its general organization two crossed pairs of generally parallel rod lengths or sections **14** and **16**, the latter being arranged in tic-tac-toe fashion and welded together at their regions of crossing. The rod sections **14** are widely spaced and constitute a support for the anchor insert in its entirety so that the insert may rest or seat upon the foundation **18** (see FIG. 4) of a concrete slab form (not shown). The rod sections **16** are more closely spaced and together with the rod sections constitue embedment rods which become widely distributed in the concerte slab S after a concrete pouring operation. The medial regions **20** of the rod sections **14** are linearly straight (see FIG. 4) and extend horizontally while the end regions of these rods are inclined downwardly as at **22** and then upwardly as at **24** to provide a pair of V-shaped foot portions **26** which are covered at their apices with elastomeric sleeves **28**. The latter are provided for the purpose of covering the metal foot portions which otherwise would become exposed at the bottom surface of the concrete wall slab S and, therefore, susceptible to rusting and corrosion.

As best shown in FIG. 5, the rod sections **16** are provided with inverted wide-angle V-shaped medial regions **30** which merge with linearly straight horizontal intermediate portions **32**. Such intermediate portions, in turn, merge with outer, upwardly directed, reentrant hook-like portions **34**. The apices of the inverted V-shaped medial regions **30** provide, in effect, downwardly facing shoulders **36** which are designed for interlocking cooperation with counterpart shoulders on the associated cable pick-up unit **12**, as will be described in detail presently.

A generally cylindrical, two-piece, sheet metal cage assembly **40** is supported from the medial regions **30** of the rod sections **16** and comprises a lower cup-shaped section **42** and an upper ring section **44** of generally cylindrical design. The lower cup-shaped section **42** underlies the medial regions **30** of the rod section **16**, while the upper ring section **44** overlies such medial regions. The upper rim region of lower section **42** and the lower rim region of the upper section **44** are formed with mating notches **46** and **48** which, when the lower rim region of the upper section is telescopically received within the upper rim region of the lower section **42**, provide, in effect, a series of four appropriately spaced slots **50** (see FIG. 1) through which the medial regions **30** of the rod sections **16** pass when the cage assembly **40** is installed upon the welded wire assembly consisting of the rod sections **14** and **16**. The medial regions **30** of the rod sections **16** extend through the cylindrical wall of the cage assembly **40** in secant fashion.

The extent to which the upper ring section **44** of the cage assembly may be telescopically received within the lower cup-shaped section **42** is limited by the provision of two diametrically disposed, radially and outwardly extending wings **51** which are provided on the upper ring section **44** and lie in a common vertical plane. These wings may conveniently be provided by making the upper ring section **44** in two 180° arcuate counterparts having laterally turned ears which, when brought into face-to-face contact and welded together, establish the two wings **51**. Relief areas **52** provide clearance regions for the upper rim region of the lower cup-shaped section **42** and right angle notches **54** in the lower outer corners of the wings receive the end portions of the medial regions of the rod sections **14** therein so that not only is the upper ring member **44** held against downward movement but it also is centered, so to speak, against lateral shifting movement on the rod sections **16**. The medial region of the upper ring section **44** of the cage assembly **40** is formed with two diametrically opposite outwardly bowed circular ribs **56** which have the ends thereof terminating at the regions where the two complemental parts of the upper ring section are joined together. These ribs not only serve to stiffen and reinforce the upper ring section **44**, but also establish a bond in the hardened concerte of the wall slab S.

From the above description, it will be observed that when the anchor insert **10** is supported upon the foundation **18** as shown in FIG. **4**, the rod sections **16**, as well as the entire cage assembly **40**, remain completely elevated from the foundation.

Referring now to FIGS. 2 and 3, the cable pick-up unit **12** comprises a length of steel cable **60** the upper end of which is secured within the shank portion **62** of a combined hinge and swivel assembly **64**, the union or connection being made by separating the ends of the cable and then bonding them in said shank portion with molten metal. The lower end of the cable **60** is similarly secured in a socket in the shank portion **66** of a T-head **68**. An annular flange **70** on the upper end of the shank portion **66** establishes a seat for the upper end of a helical compression spring **72**. Such spring surrounds the shank portion **66**, has its lower end in abutment with a slidably mounted washer **74** on the lower end of the shank portion **66**, and serves yieldingly to urge the washer downwardly against the cross part of the T-head **68**. A pair of recesses **76** is formed in the cross part of the T-head on opposite sides of the shank portion **66**, and such recesses are designed to receive the V-shaped medial regions **30** of the rod sections **16** therein when the T-head is interlocked with the anchor insert **10** in a manner that will be made clear presently.

A mushroom-shaped pressure member **80** is loosely slidable on the cable **60** and includes a circular pressure plate or head **82** and a cylindrical depending shank **84**. The head is formed with a bell-shaped mouth **86** (see FIG. 4) which communicates with the upper end of a downwardly facing socket **88** in the shank **84**, the latter being capable of telescopic reception over the shank portion **66** of the T-head **68** for purposes that will be made clear presently when the description of the operation of the anchor insert **10** and the cable pick-up unit **12** is set forth. An elastomeric pad **90** in the form of a ring underlies the pressure plate **82** and is preferably adhesively connected thereto. Such ring serves because of its resilient action to equalize the pressure of the head **82** of the pressure member **80** when the latter is in overlying relation with the top surface of the concrete wall slab S and the pick-up unit **12** is subjected to slab hoisting operations.

In the operation of the herein described anchor insert and cable pick-up unit, in order to form a slab such as the slab S, the slab form is erected in the usual manner and at each location within the form where an anchor point in the finished slab is desired, one of the assembled anchor inserts **10** is positioned on the form foundation **18** with the four elastomeric sleeves **28** resting on the upper surface of such foundation. A suitable hollow post or sleeve (not shown) is positioned in the open upper rim region of the ring section **44** of the cage assembly **40** of each insert so that it projects vertically upwardly above the level of the upper surface of the slab to be formed and excludes the entrance of concrete into the interior of the cage assembly **40**. The cage assembly may be further sealed by forcing a suitable putty-like substance into the slots **50** and packing the same tightly about the ends of the medial regions **30** of the rod sections **16**. The concrete is then poured into the form to the desired height or thickness and then allowed to harden. Thereafter, the posts are removed from the upper rim regions of the ring sections **44** of the various anchor inserts, thus leaving cylindrical passages or holes **92** in the concrete and in vertical register with each cage assembly **40**. Each anchor insert **10** is then ready for interlocking cooperation with one of the cable pick-up units **12**.

To establish such interlocking cooperation between an anchor unit **10** and a pick-up unit **12**, the operator, by grasping the cable **60** in the manner shown in FIG. 3, may insert the T-head **68** through the hole **92** in the concrete with the T-head so oriented that it will pass between the two inverted V-shaped medial regions **30** of the rod sections **16** and extend into the lower cup-shaped section **42** of the cage assembly **40** well below the level of such medial regions **30**. Thereafter, by a twisting action wherein the T-head is caused to turn through an angle of 90° so that the opposite end regions of the cross part of the T-head underlie the medial regions **30**, the two recesses **76** are caused to move into vertical register with the apices of the two medial regions **30**. Upon such downward movement of the T-head **68**, the washer **74** comes to rest upon the rod sections **16** and the spring **72** is compressed. Upon release of the cable **60** by the operator, the spring **72** causes the cross part of the T-head **68** to become elevated into contact with the medial regions **30** of the rod sections **16** with the rod sections becoming seated within the recesses **76** so that the interlocking operation is completed. The spring **72** and the washer **74** continue to exert an upward pulling action on the T-head **68** so that inadvertent loosening of the pick-up unit **12** during handling of the cable and attachment thereof to an overhead hoist for slab-lifting purposes is precluded.

Prior to attachment of the combined hinge and swivel assembly **64** to the overhead hoist, the shank **84** of the mushroom-shaped pressure member **80** is inserted into the

hole **92** in the concrete slab S and the pad **90** is caused to seat upon the upper rim region of the hole. Preferably, but not necessarily, the length of the shank **84** of the pressure member **80** is such that the lower rim region of the shank portion will enter the upper rim region of the ring member **44** (see FIG. 5) when the pressure member is installed in the hole **92**.

After the hinge and swivel assembly **64** has been suitably attached to an overhead hoist and lifting operations have commenced, the upward tension or lifting force applied to the anchor insert **10** is exerted by the T-head **62** directly upon the apex regions of the inverted V-shaped medial regions **30** of the two rod sections **16** and the portions of these rod sections within the cage assembly **40** are placed under tension. The bell-shaped mouth **86** that is associated with the pressure member **80** permits the cable to move to different positions with respect to the horizontal top surface of the slab S without imposing any sharp bending strains in the cable. Thus, spalling of the concrete in the upper rim region of the hole **92** is effectively prevented while at the same time the pressure member **80** as a whole is forced downwardly and the resilient pad **90** is compressed against the top surface of the slab S.

After the slab has been hoisted to its final position, such, for example, to a vertical position when the slab is to form a vertical wall, release of the interlocking connection between the pick-up unit **12** and the anchor insert **10** may be effected by the simple expedient of applying pressure to the cable **60** so as to force the cross part of the T-head **62** away from the two rod sections **16** and then turning the T-head to a position of angular register with the void between the medial regions **30** of the two rod sections **16** so that the entire lower region of the pick-up unit may be withdrawn axially from the anchor insert **10** and the hole **92**. Finally, the hole **92** may be filled with a suitable patching cement. The pick-up unit, after such removal, may then be reused in a subsequent pick-up operation.

The invention is not to be limited to the exact arrangement of parts shown in the accompanying drawings or described in this specification as various changes in the details of construction may be resorted to without departing from the spirit or scope of the invention. Therefore, only insofar as the invention has particularly been pointed out in the accompanying claims is the same to be limited.

Having thus described the invention what we claim as new and desire to secure by Letters Patent is:

1. In combination, an anchor insert for embedment in a concrete slab and a cooperating pick-up unit therefor, said anchor insert comprising two pairs of spaced parallel rod sections arranged in cross tic-tac-toe fashion and welded together at coplanar regions of crossing, each pair of rod sections having inside medial regions bridging the distance between the other pair of rod sections and having outside end regions, the outside end regions of one pair of rod sections having downwardly extending portions designed for support on a slab foundation, and a cage mounted upon the medial regions of said one pair of rod sections and having a circular bottom wall, a generally cylindrical upstanding marginal wall, and a circular open upper rim, the medial regions of said one pair of rod sections projecting in secant fashion through said side wall and passing through respective pairs of openings in the latter, said cage being imperforate except for said pairs of openings and open upper rim, said pick-up unit comprising a T-head having a shank and designed and placed in interlocking engagement with the medial regions of said one pair of rod sections when inserted through said open rim of the cage below the level of said latter medial regions and then turned through an angle of approximately 90°, and means on the upper end of the shank whereby said pick-up unit may be attached to an overhead hoist.

2. The combination set forth in claim **1** and including, additionally, elastomeric sleeves telescopically received over said downwardly extending portions of said one pair of rod sections and designed for direct contact with the slab foundation.

3. The combination set forth in claim **1** and wherein said downwardly extending portions on said one pair of rod sections are in the form of upright V-sections, the apices of which are designed for effective support on the slab foundation.

4. The combination set forth in claim **1** and wherein said downwardly extending portions on said one pair of rod sections are in the form of upright V-sections, the combination further including elastomeric sleeves telescopically received over said one pair of rod sections and covering only the apices of the V-sections.

5. The combination set forth in claim **1** and wherein the medial regions of said one pair of rod sections are of inverted V-shape and provide apices which are designed for interlocking engagement with said T-head.

6. The combination set forth in claim **1** and wherein the cross part of said T-head is formed with upwardly facing recesses on opposite sides of said shank and designed for interlocking engagement with the medial regions of said one pair of rods.

7. The combination set forth in claim **1** and wherein the medial regions of said one pair of rod sections are of inverted V-shape and wherein the cross part of said T-head is formed with upwardly facing recesses on opposite sides of said shank and designed for interlocking engagement with the apices of said V-shaped medial regions.

8. The combination set forth in claim **1** and including, additionally, a shoulder on said shank adjacent to the upper end thereof, a washer slidable on said shank, and a helical compression spring interposed between said shoulder and washer, said washer being engageable with the medial regions of said one pair of rod sections when the T-head is inserted through the open rim of the cage to urge the T-head upwardly and maintain interlocking engagement between the latter and said medial regions.

9. The combination set forth in claim **1** and wherein the spacing between the rod sections of the other pair is greater than the diameter of the cage with said rod sections straddling the cage on opposite sides thereof.

10. The combination set forth in claim **1**, wherein said downwardly extending portions on said one pair of rod sections are in the form of upright V-sections the apices of which are designed for effective support on the slab foundation, and wherein the outside end regions of the other pair of rod sections are turned upwardly and provide reentrant hook portions.

11. The combination set forth in claim **1** and wherein the means on the upper end of the shank for attaching the pick-up unit to the overhead hoist comprises a cable, said combination including, additionally, a pressure member slidable on said cable and including a pressure plate adapted to rest upon the upper face of the slab and a shank depending from said pressure plate and having its lower end receivable in the upper rim of said cage, said pressure plate being formed with a bell-shaped mouth through which the cable extends.

12. In combination, an anchor insert for embedment in a concrete slab and a cooperating pick-up unit therefor, said anchor insert comprising two pairs of spaced parallel rod sections arranged in cross tic-tac-toe fashion and welded together at coplanar regions of crossing, each pair of rod sections having inside medial regions bridging the distance between the other pair of rod sections and having outside end regions, the outside end regions of one pair of rod sections having downwardly extending portions designed for support on a slab foundation, and a two-part separable cage mounted upon the medial regions of said one pair of rod sections and including a lower cup-shaped cage section having a bottom wall, an upstanding generally cylindrical side wall and an open circular upper rim, and a generally cylindrical open-ended tubular cage section having its lower rim disposed in interfitting telescopic relation with the upper rim of

the lower cage member, said interfitting rims being provided with opposed registering notches therein defining openings through which the rod sections of the one pair project in secant fashion with respect to the cage, said cage being imperforate except for said openings and the upper rim of the tubular cage section, said pick-up unit comprising a T-head having a shank and designed and placed in interlocking engagement with the medial regions of said one pair of rods when inserted through said open rim of the cage below the level of said latter medial regions and then turned through an angle of approximately 90°, and means on the upper end of said shank whereby the pick-up unit may be attached to an overhead hoist.

13. The combination set forth in claim **12** and including, additionally, a pair of diametrically disposed radially extending side wings formed on said upper cage section and presenting downwardly facing shoulders designed for engagement with the medial regions of the other pair of rod sections, and also presenting outer side surfaces designed for engagement with said latter medial regions whereby the cage is centered between said other pair of rod sections.

14. The combination set forth in claim **12** and including, additionally, a shoulder on said shank adjacent to the upper end thereof, a washer slidable on said shank, and a compression spring interposed between said latter shoulder and washer, said washer being engageable with the medial regions of said one pair of rod sections when the T-head is inserted through the open rim of the cage to urge the T-head upwardly and maintain interlocking engagement between the latter and said medial regions.

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U.S. Cl. X.R.

52—125, 687, 706; 294—89