

May 12, 1964

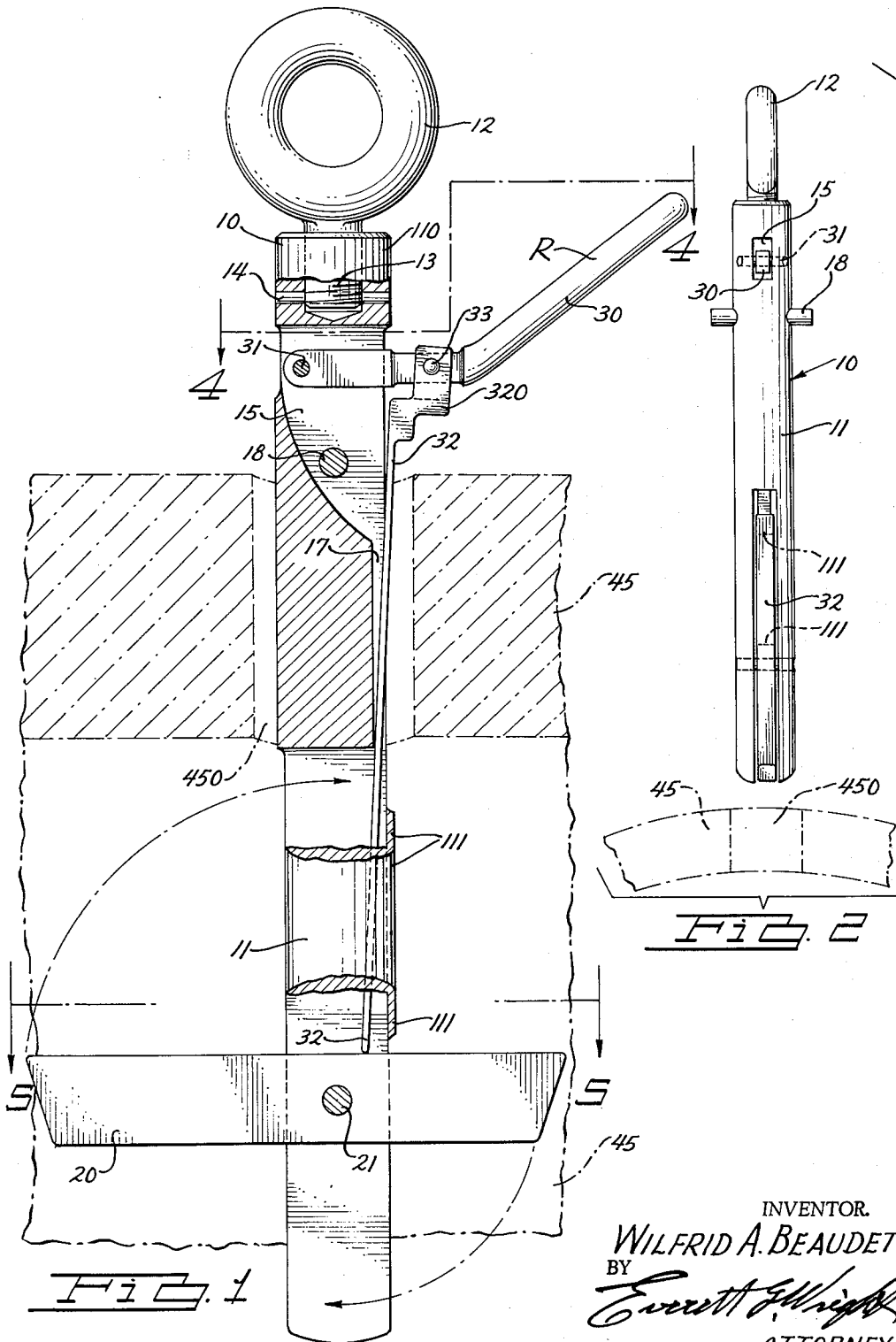
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GRAPPLES FOR LIFTING APERTURED ITEMS

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2 Sheets-Sheet 1



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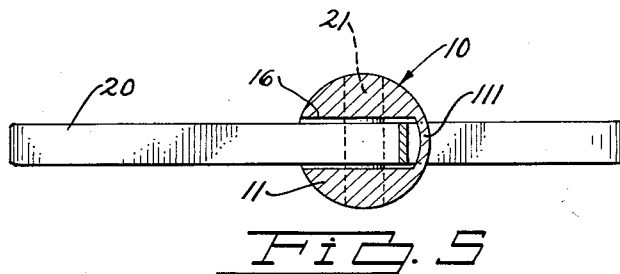
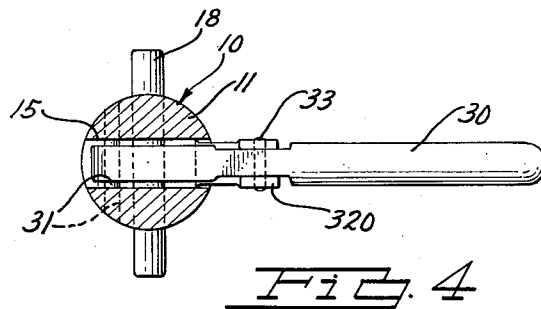
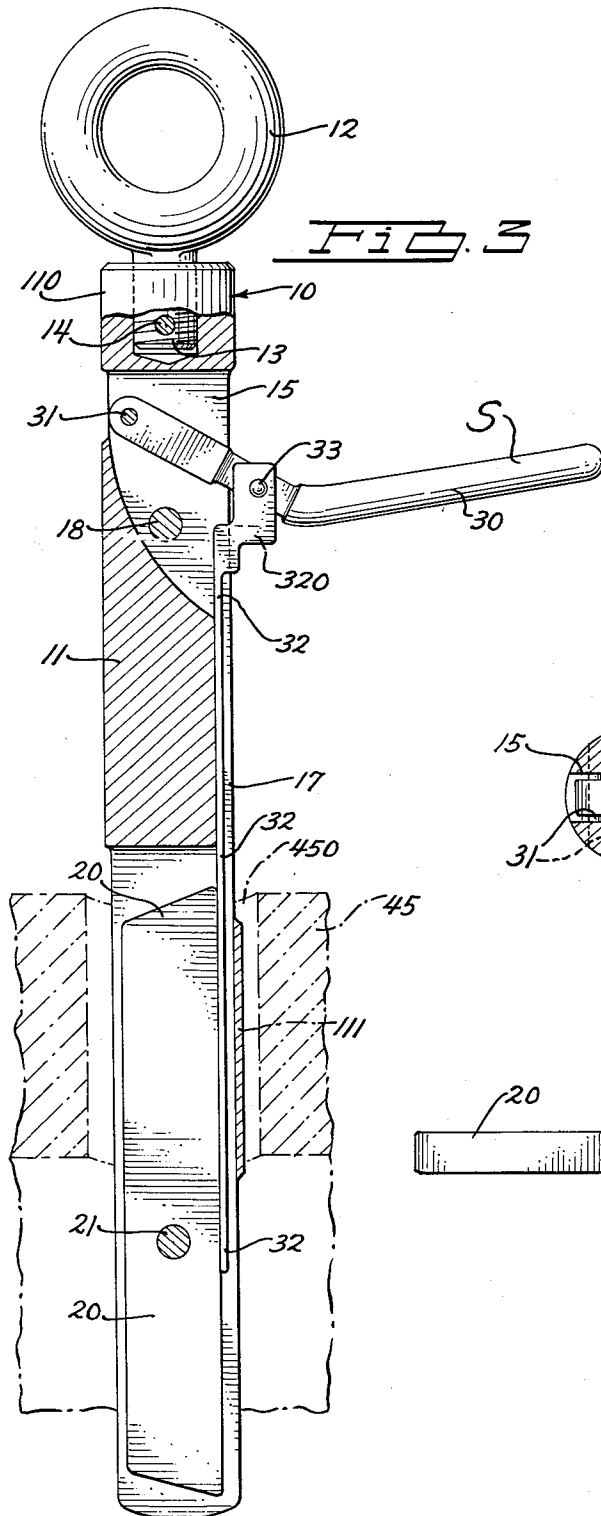
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## 3,132,890 GRAPPLES FOR LIFTING APERTURED ITEMS

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In the handling and laying of heavy concrete sewer pipe and other difficult to sling and lift items, it has been found that the provision of a relatively small lifting aperture therethrough permits the item to be engaged and lifted by inserting a grapple chain or cable through the lifting aperture and securing it to or looping it around an anchor bar disposed inside the pipe below the lifting aperture. This method and means for picking up apertured items, although more desirable than using an exterior lift sling, is cumbersome and requires time and labor to make fast the grapple chain or cable to the apertured item to be crane lifted and placed in a particular place or position.

With the foregoing in view, the primary object of this invention is to provide an improved and effective grapple for use on a crane hook or the like in lifting apertured items, the said grapple being readily and effectively placed in and out of lifting engagement with the apertured item.

A further object of the invention is to provide an improved grapple for lifting apertured items including a lifting bar stowable therewithin and effective means for moving said lifting bar to its stowed position and releasing it therefrom to a lifting position after insertion of said grapple through a lift aperture provided therefor in the item to be lifted thereby.

Other objects of the invention will become apparent by reference to the following detailed description taken in connection with the accompanying drawings, in which:

FIG. 1 is a vertical side elevational view of a grapple embodying the invention with parts broken away to clearly indicate its construction, the grapple being shown as having been inserted through a lift aperture provided therefor in an item to be lifted, and with the lifting bar disposed in its horizontal lift position.

FIG. 2 is a vertical side elevational view taken from the left side of the grapple shown in FIG. 1 but with the lifting bar stowed therewithin, and the grapple about to be inserted through the lift aperture provided in the item to be lifted.

FIG. 3 is a side elevational view similar to FIG. 1 showing the lifting bar stowed within the grapple, and with the lifting bar maintained in such stowed position by the lever operated stow bar.

FIG. 4 is a horizontal sectional view taken on the line 4-4 of FIG. 1.

FIG. 5 is a horizontal sectional view taken on the line 5-5 of FIG. 1.

Referring now to the drawings wherein like reference numerals refer to like and corresponding parts throughout the several views, the grapple 10 embodying the invention disclosed for illustrative purposes comprises a preferably round vertically disposed grapple bar 11 having a lift hook eye 12 preferably threaded at 13 and pinned by a pin 14 in the head 110 thereof.

The upper portion of the grapple bar 11 has a vertically disposed upper central slot 15 therein to accommodate a lifting bar stow and release lever 30 pivoted by a pivot pin 31 to the grapple bar 11. The lower portion of the grapple bar 11 has a vertically disposed lower central slot 16 therein to accommodate therewithin a pivoted lifting bar 20 pivoted by a pivot pin 21 to the grapple bar 11. The slot 16 in the grapple bar 11 that accommodates the pivoted lifting bar 20 extends completely

through the lower portion of said grapple bar 11 except at one outside wall thereof leaving a guide 111 to maintain the lifting bar stow and release arm 32 in a proper operating position within the grapple bar 11. The outer portion of the said grapple bar 11 is grooved at 17 to accommodate and guide the lifting bar stow and release arm 32 above the central slot 16 in the lower end of the grapple bar 11. In the particular construction illustrated, the upper central slot 15, the lower central slot 16 and the groove 17 in the grapple bar 11 are all of the same width, and are in alignment with each other. The upper end of the lifting bar stow and release arm 32 is suitably formed at 320 for pivoting to the lifting bar stow and release lever by a pivot pin 33 as best shown in FIGS. 1 and 3.

The lifting bar 20 is pivoted on eccentrically located pivot pin 21 in the slot 16 so that when it is in its vertical stowed position there will be operating clearance between the said lifting bar 20 and the guide 111 for the lifting bar stow and release arm 32. The lifting bar 20 is itself eccentrically mounted on the pivot 21 so that it will pivot by gravity to a generally horizontal position as shown in FIG. 1 upon the manual raising of the lifting bar stow and release lever 30 from its STOW position S shown in FIG. 3 to its RELEASE position R shown in FIG. 1.

A safety pin 18 extending radially outwardly from the grapple bar 11 is located just below the lifting bar stow and release lever 30 to prevent damage to the said lifting bar stow and release lever 30 in the event the grapple is accidentally dropped through a lifting aperture 450 provided therefor in an item 45 to be lifted. The item 45 is indicated by dot and dash lines in FIGS. 1, 2 and 3 as being a large reinforced concrete sewer pipe; however, it is obvious that the grapple 10 may be constructed and employed in the lifting of other items of other sizes.

In using a grapple 10 embodying the invention to lift an apertured item 45 such as a large concrete pipe or the like, a lifting aperture 450 is provided therein. A grapple 10 embodying the invention is hooked through its eye 12 by a crane hook, not shown, and the said grapple 10 is lowered through the lifting aperture 450 until the safety pin 18 actually or substantially comes to rest on the top of the said item 45 to be lifted. This is an indication that the grapple 10 is sufficiently extended through the lifting aperture 450 in the item 45 to be lifted to permit the release of the lifting bar 20.

The lifting bar 20 is released by raising the lifting bar stow and release lever 30 from its STOW position S shown in FIG. 3 by raising the said lifting bar stow and release lever 30 to its RELEASE position R indicated in FIG. 1. This raises the lifting bar stow and release arm 32 and permits the lifting bar to pivot by gravity to a generally horizontal position as shown in FIG. 1 in which general horizontal position it is maintained by the lifting bar and release arm 32, see FIG. 1. The said item 45 to be lifted may now be lifted by the said grapple 10.

After the said item 45 is lifted and again lowered to the desired position or place, the grapple 10 is lowered in respect to the said item 45 until the safety pin 18 is substantially in contact with the top of the said item. The lifting bar stow and release lever 30 is now lowered from its RELEASE position R to its STOW position S whereupon the said lifting bar stow and release arm 32 pivots the said lifting bar 20 to its vertical stowed position shown in FIG. 3, and maintains the said lifting bar 20 in its stowed position—thusly permitting the said grapple 10 to be removed from the lifting aperture 450 in the lifted item 45 and remain in readiness to repeat the lifting and placement operation just described.

Although but a single embodiment of the invention has been disclosed and described herein, it is obvious that many changes may be made in the size, shape, arrangement and details of the various elements of the invention without departing from the spirit and scope thereof as defined by the appended claims.

I claim:

1. A grapple for lifting sewer pipe and the like having through a wall thereof a grapple aperture for accommodating said grapple therethrough comprising
  - a vertically disposed grapple bar including means at the head end thereof for engagement by a lift hook, said grapple bar having a vertical slot in the lower portion thereof to accommodate a lifting bar and a slot parallel to the vertical slot in the upper portion thereof to accommodate a stow and release lever, a pivot pin disposed transversely through said grapple bar across said lower slot therein,
  - a lifting bar eccentrically pivoted on said pivot pin pivotable by gravity to a horizontally disposed lifting position,
  - a stow and release arm movable axially downwardly of said grapple bar to a STOW position pivoting and holding said lifting bar in a vertical stowed position within said grapple bar in which position the lower portion of said grapple bar may be lowered through a grapple aperture in a pipe, said stow and release arm being movable axially upwardly from said STOW position to a RELEASE position whereby to release said lifting bar for pivoting by gravity to its horizontal lifting position within a pipe, stop means contacting said bar in the RELEASE position, and
  - a stow and release lever having one end thereof disposed in said uppermost slot mounted on a transverse pivot through said grapple bar and linked to the upper end of said stow and release arm for moving the same axially to and from its STOW and RELEASE positions.
2. A grapple for lifting sewer pipe and the like having through a wall thereof a grapple aperture for accommodating said grapple therethrough comprising
  - a vertically disposed grapple bar including means at the head end thereof for engagement by a lift hook,

- said grapple bar having a vertical slot in the lower portion thereof to accommodate a lifting bar and a slot parallel to the vertical slot in the upper portion thereof to accommodate a stow and release lever,
- a pivot pin disposed transversely through said grapple bar across said lower slot therein,
  - a lifting bar eccentrically pivoted on said pivot pin pivotable by gravity to a horizontally disposed lifting position,
  - stop means to retain said bar in the lifting position,
  - a stow and release arm movable axially downwardly of said grapple bar to a STOW position pivoting and holding said lifting bar in a vertical stowed position within said grapple bar in which position the lower portion of said grapple bar may be lowered through a grapple aperture in a pipe, said stow and release arm being movable axially upwardly from said STOW position to a RELEASE position whereby to release said lifting bar for pivoting by gravity to its horizontal lifting position within a pipe,
  - an outer wall of said grapple bar forming a guide over the lower slot above said lifting bar pin retaining said stow and release arm in operative position in said lower grapple bar slot,
  - a stow and release lever having one end thereof disposed in said uppermost slot mounted on a transverse pivot through said grapple bar and linked to the upper end of said stow and release arm for moving the same axially to and from its STOW and RELEASE positions, and
  - a transverse safety pin disposed through and extending from said grapple bar below said transverse pivot mounting said stow and release lever means limiting the extent to which said grapple bar may be inserted through a grapple aperture in the item to be lifted.

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