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[54] **INSIDE PIPECUTTER**

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[51] **Int. Cl.**.... **B23d 21/08;** B23d 21/14; B26d 3/16

[58] **Field of Search** 30/103, 104, 105, 106, 30/107, 108

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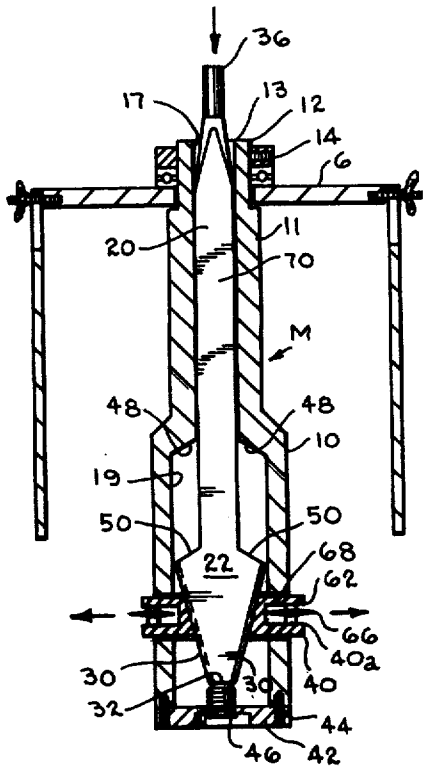
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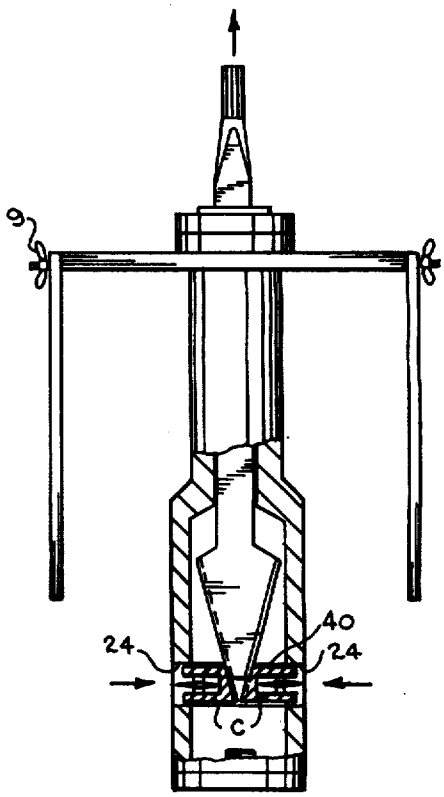
Primary Examiner—Al Lawrence Smith
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[57] **ABSTRACT**

An inside pipecutter for cutting plastic pipe encased in concrete such as a drain pipe extending through a concrete floor including a rotatable mandrel having a plurality of radially movable cutters mounted therein and having an axially movable wedge for moving such cutters radially outwardly as the mandrel is rotated. The apparatus also includes a guide means for setting the depth of the cut-off of the pipe relative to the upper surface of the concrete floor through which the pipe extends.

5 Claims, 4 Drawing Figures





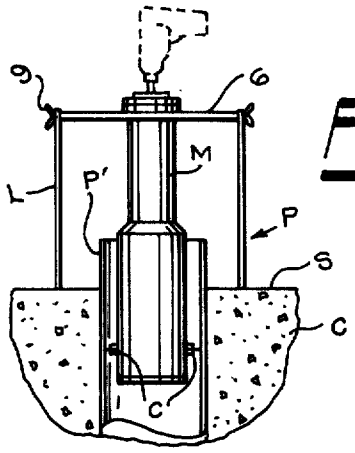


Fig. 1

Fig. 2

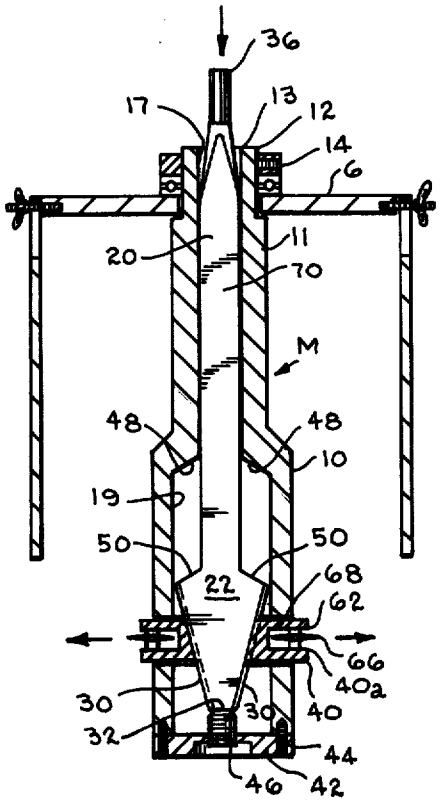


Fig. 3

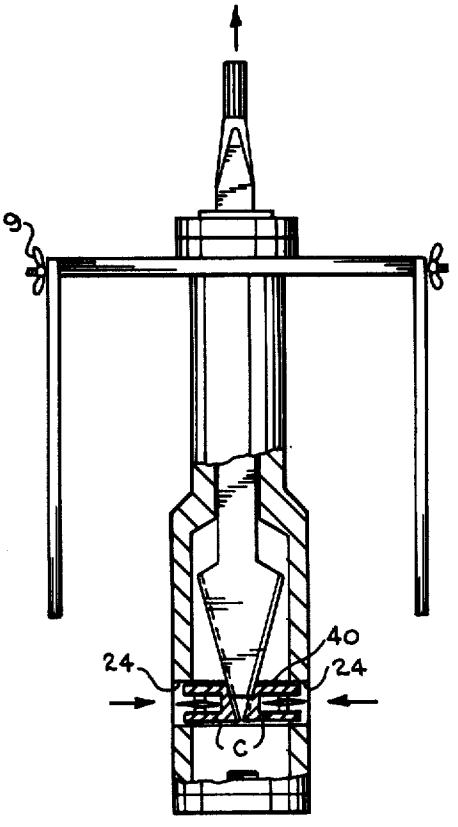


Fig. 4

INSIDE PIPECUTTER

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention pertains to a rotatable inside pipecutter for cutting off the end of a PVC or other plastic pipe extending through a concrete slab or floor.

2. Description of the Prior Art

Various prior art devices have been provided for cutting off plastic pipe in a concrete slab. However, such devices do not provide a means for cutting the upper edge of the pipe substantially parallel to the concrete slab on the first cut, but rather usually require that the stub of the plastic pipe protruding above the concrete slab be cut in a plane substantially parallel to the surface of the concrete and using the cut upper edge as a guide, the pipecutter then cuts a second time inside of the pipe and beneath the upper edge of the concrete slab.

SUMMARY OF THE INVENTION

The present invention provides a new and improved rotatable inside pipecutter comprising a mandrel having one or more cutters mounted therein and movable radially outwardly as the mandrel is rotated for cutting the pipe and further, the invention includes adjustable guide means for setting the depth of the cutter in the PVC pipe relative to the upper surface of the concrete slab or floor through which the pipe protrudes to enable a cut to be made in the desired elevation relative to such upper surface.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a elevational view of the inside pipecutter apparatus of the present invention shown in place in a pipe in a concrete slab;

FIG. 2 is an isometric exploded view of the pipecutter of the present invention showing the cutter carriers and the wedge-shaped drive means and the mandrel;

FIG. 3 is a transverse sectional showing the assembly of the parts of the apparatus with the cutters in an extended position; and

FIG. 4 is a view partially in elevation and partially in section showing the cutters retracted into the mandrel.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The pipecutter apparatus of the present invention is designated generally P in FIG. 1 of the drawings. Such apparatus includes a mandrel M, a guide G and one or more cutter assemblies C which are rotated with the mandrel. A wedge-shaped cutter drive W shown in FIG. 2 of the drawings is provided for moving the cutters C radially inwardly and outwardly relative to the mandrel M. The guide G includes a pair of legs L which support the mandrel M with the cutters C at a desired elevation relative to the upper surface S of the concrete C in which the pipe P' is imbedded.

It will be appreciated that with this invention it makes no difference how far the upper end of the pipe P' protrudes above the upper surface S of the concrete C so long as it is not so far as to engage the guide G and also, it does not make any difference whether the upper edge of the protruding section of pipe P' is straight, or jagged or cut at an angle as the pipe cutting apparatus of the present invention uses the upper surface of the concrete S as a reference for setting the depth of the cut by the cutters C and does not engage the upper surface of the protruding pipe P'.

Considering now the apparatus of the present invention in more detail, the mandrel M comprises a large diameter body portion **10**, an intermediate diameter body portion **11** thereabove, and a reduced diameter body portion **12** adjacent to the upper end **13** for receiving thrust bearings **14** and the guide plate G. As shown, the mandrel is provided with a non-circular opening **17** extending through the intermediate diameter portion **11** for receiving the non-circular upper end of the wedge drive shaft **20** as will be described in detail hereinafter. Further, a rectangular opening **19** is provided in the larger diameter portion **10** for receiving the drive wedge **22** of the wedge-shaped member W. Such rectangular portion is of a sufficient width in its larger dimension to accommodate the wedge-shaped drive head **22** and is of a sufficient distance in its narrower dimension so as to engage the opposite parallel sides **22***a* and **22***b* for guiding such wedge-shaped drive member as it moves axially of the mandrel M.

The mandrel M also includes in the preferred embodiment illustrated in FIGS. **2**, **3**, and **4** of the drawings a pair of side windows or openings **24** through which the cutters C protrude for cutting the pipe or are retracted as shown in FIG. **4**. In the preferred embodiment of the present invention, a pair of diametrically opposed cutters C are employed for cutting the pipe. However, it will be appreciated that other cutter arrangements may be used without departing from the spirit of the present invention.

As shown in FIGS. **2**, **3** and **4** of the drawings, the wedge-shaped drive W comprises a longitudinally extending rectangular or non-circular shaft portion **20** which engages the correspondingly rectangular or non-circular opening **17** extending through the upper portion **11** of the mandrel M for rotating the mandrel M and the cutters C. The lower end of the wedge-shaped drive member W comprises a wedge member **22** which includes a pair of downwardly and inwardly extending sides **30** which are tapered toward the center line of the mandrel M. Such wedge-shaped member is provided with a blunt point **32** which engages a stop in the lower end of the mandrel **10** as will be described in detail hereinafter. The tapered sides **30** of the wedge drive head **22** are provided with a channel or lip portion **23** which engages a corresponding interlocking channel or lip portion **34** on each of the carrier blocks **40** of the cutters C. Such interlocking flanges **34** and **23** cause the carrier blocks **40** to move radially inwardly and outwardly as the wedge drive head **22** is moved axially upwardly and downwardly in the mandrel M. The upper end of the wedge-shaped drive member W is provided with a circular neck portion **36** for connecting an electric drill or other drive apparatus for rotating the mandrel M and the cutters C. It will be appreciated that the electric drill or other drive means connected to the neck **36** may also be used to move the shaft **20** upwardly and downwardly to thereby move the wedge block **22** so as to move the carriers **40** radially in and out of the windows or apertures **24** relative to the mandrel body **10**.

A bottom plate **42** is provided in the lower end of the mandrel **10** and secured therein by suitable screws **44** or other suitable securing means. Such bottom plate includes a threaded stop member **46** which projects upwardly in the center of the body **10** for engaging the

lower blunt end 32 of the wedge member 22 for providing a stop so as to limit the downward movement of the wedge body 22 and the outward movement of the cutter block 40. As shown, a downwardly and outwardly inclined shoulder 48 is provided on the inner surface of the mandrel adjacent the upper end of the rectangular bore 19 and a corresponding inclined surface 50 is provided on either side of the wedge block 22 to allow the wedge block to be moved upwardly so as to move the cutter carriers 40 inwardly in a retracted position such as shown in FIG. 4 of the drawings.

The cutter blocks 40 are provided with downwardly and inwardly tapered inner sides 60 on which the interlocking lip 34 is formed and are also provided with a transverse slot or opening 62 which extends in a plane substantially perpendicular to the axis 70 of such mandrel M. The cutter blades 66 are mounted on suitable pins 68 carried in the cutter housing 40 and extending transversely of the notch or opening 62. The cutter blades 66 are disc-shaped members having a sharpened circumferential edge that are mounted on the pins 68 so as to project outwardly beyond the outer end 40a of the wedge-shaped block 40.

STATEMENT OF OPERATION

In cutting the top portion out of a section of plastic pipe P' which extends through a concrete slab C and projects or protrudes thereabove as shown in FIG. 1 of the drawings, the pipe cutting apparatus of the present invention is positioned with the mandrel M inserted into the upper open end of the pipe P'. The depth at which the cutters C' are set is controlled by adjusting the height of the transverse member G of the legs L. With the cutters at the desired elevation, a power drill or other suitable drive device is secured to the neck 36 and actuated for rotating the drive shaft 20 which in turn rotates the mandrel M relative to the gauge or cross member G and the legs L. As the wedge member W is moved downwardly during rotation it urges the cutter carriers 40 radially outwardly so as to cause the cutters 66 to protrude through the apertures or openings 24 and into cutting engagement with the interior surface of the pipe P'. As the cutters 66 begin to cut, continued downward pressure on the wedge-shaped member W continues to urge the cutters radially outwardly until the pipe has been completely severed. Thereafter, the apparatus P is withdrawn from the severed end portion of the pipe P' by moving the non-circular drive means axially outwardly with respect to the mandrel M to thereby retract the cutter means back into the mandrel M.

The foregoing disclosure and description of the invention are illustrative and explanatory thereof, and various changes in the size, shape, and materials as well as in the details of the illustrated construction may be made without departing from the spirit of the invention.

I claim:

1. An inside pipecutter for cutting off plastic pipe encased in concrete at some desired elevation above or below the upper surface of the concrete comprising:

a. a rotatable mandrel adapted to be inserted into the upper open end of a section of plastic pipe embedded in concrete and protruding above the upper surface of such concrete;

b. guide means for supporting said rotatable mandrel adjacent its upper end with its lower end in the pipe, said guide means including a plurality of adjustable legs for supporting said mandrel at a desired elevation relative to the upper surface of the concrete;

c. cutter means carried by said rotatable mandrel and movable radially outwardly beyond the outer circumference of said mandrel and into engagement with the inner surface of the plastic pipe for cutting same;

d. means for rotating said mandrel;

e. drive means for urging said cutter means radially outwardly for cutting the pipe upon rotation of said mandrel, said drive means including a wedge shaped drive means; and

f. adjustable stop means in said mandrel for limiting downward movement of said wedge shaped drive means, said stop means being mounted for adjustment from the exterior of said mandrel.

2. The invention of claim 1 wherein:

said mandrel is a cylindrical member having a non-circular passage extending axially thereof and wherein said means for rotating said mandrel is a non-circular member carried in said non-circular passage.

3. The invention of claim 1 wherein:

said mandrel has a pair of openings on opposite sides thereof through which said cutter means are radially movable.

4. The invention of claim 1 including:

cutter carriage means and wherein said wedge shaped drive means includes a pair of inwardly and downwardly tapered surfaces for engaging corresponding tapered surfaces on said cutter carriage means.

5. The invention of claim 4 wherein:

said inwardly and downwardly inclined surfaces on said wedged shaped drive means and said cutter carriage means include interlocking channel means connecting said cutter carriage means and said wedge shaped drive means.

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