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RECOVERY OF CASING FROM WELLS

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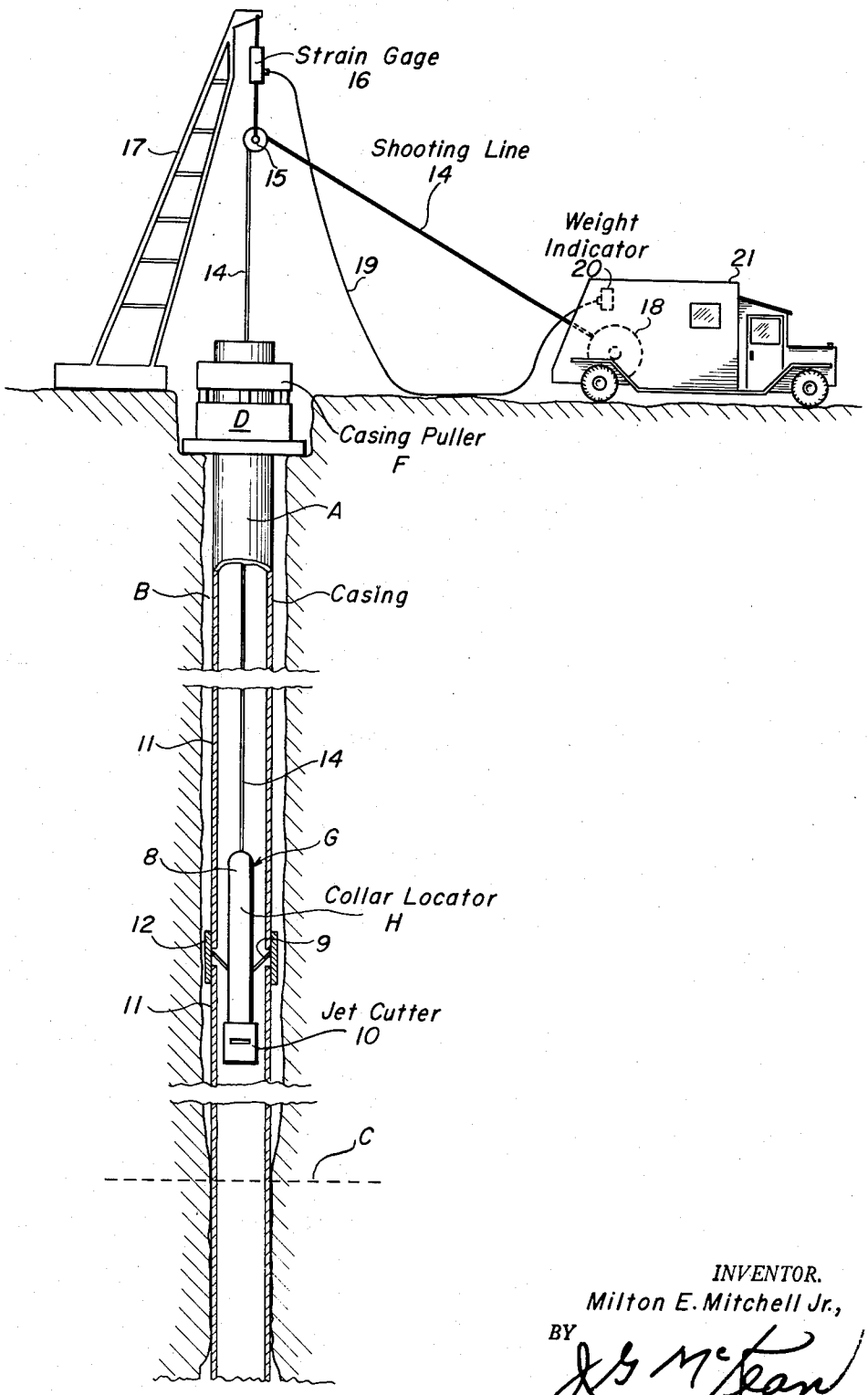


INVENTOR.
Milton E. Mitchell Jr.,
BY
J. G. McLean
ATTORNEY.

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# RECOVERY OF CASING FROM WELLS

Milton E. Mitchell, Jr., Winters, Tex., assignor, by mesne assignments, to Esso Research and Engineering Company, Elizabeth, N. J., a corporation of Delaware

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1 Claim. (Cl. 166—4)

This application is directed to a method for recovering the free part of a string of tubular members, such as casing, stuck at some point in a well.

The method for practicing the present invention will be described in conjunction with the drawing in which the sole figure is in the form of an elevation partly in section with some parts exaggerated in relation to other parts to aid in illustrating the invention.

Turning now specifically to the drawing, a string of casing A in borehole B has become stuck at point C which is of substantial distance below the wellhead D and above the lower end of the casing A. In accordance with the present invention the stuck point C is located and the pipe cut off at approximately this point or adjacent and slightly above this point so that all the pipe above C, which is free to move, may be withdrawn from the well and salvaged.

The casing A is made up of sections of pipe **11** with the ends fastened together in the usual manner by couplings **12**.

A device F is arranged to exert a tension on the upper end of the string of casing A so that the free end of the pipe will be caused to stretch, such a suitable means being illustrated as a hydraulic casing puller or jack F, such as is well known to the art.

An assembly G which is capable of giving a determination of tension at spaced points along the pipe is provided, and in the specific embodiment shown consists of a collar locator H suspended from a line **14**, said line being suspended at the wellhead from a pulley **15** which in turn is connected through a strain gage **16** to a support means shown as a gin pole **17** in the drawing. As seen in the drawing, collar locator H has a body **8** with flexible wire feelers **9**. Run on line **14** in conjunction with collar locator H is a jet cutter **10** which is shown in the drawing merely as a rectangle for the purpose of simplifying the showing since jet cutters as such are known to the art. The line **14** is connected to a hoist **18**. Strain gage **16** is electrically connected through electrical conductor **19** to an indicating device **20**. Hoist **18** and indicating device **20** may be conventionally mounted as in a truck **21**.

Assemblies suitable for use as assembly F are well known to the art and in order to simplify the description in the present case will not be described in detail. Further information relative to such devices may be found, for example, in Kent's Mechanical Engineer's Handbook, Design and Production Volume, Twelfth Edition, John Wiley & Sons, Inc., New York, 1950, section 8, page 50, section 18, pages 25–27.

In determining the point C in which the casing is stuck in the well, the collar locator H is moved vertically along the pipe and at a series of collars **12** in sequence the feelers **9** are pulled into collars **12** and tension is



exerted on line **14**, the weight resulting from said tension is indicated and while holding this known strain on the wire line a tension is exerted on the upper end of the string of casing by means of hydraulic casing puller F. At point C and all points vertically below C, the exertion of a tension on the upper end of casing C does not change the reading of the strain gage. At points above stuck point C the exertion of tension on the upper end of the string of casing through hydraulic casing puller F causes a drop in the strain exerted on line **14** as indicated by indicating device **20**. The depths of the points along the casing at which these determinations are made are readily known, as by the use of suitable markings on the line **14**. Thus in this fashion the exact point C at which the casing is stuck may be determined. After this point has been determined the string of casing is cut at or immediately adjacent and above the stuck point C by means of jet cutter **10** which is run in conjunction with collar locator H. Means for cutting casing are well known to the art and in order to simplify the description and showing of the present case such specific means are not described or shown in the drawing. After the casing has been cut at or immediately adjacent and above point C, the free string of casing, that is all of the casing above the cut point may be withdrawn from the well and salvaged.

From the foregoing description it will be seen that the present invention is directed to a procedure for salvaging a maximum amount of the upper free portion of a pipe which is stuck in a well at some point remote from the surface of the earth. The procedure involves a sequence of operations in which at a plurality of vertically spaced points along a string of pipe a determined amount of strain is taken on a structural member independent of the pipe and thereafter a tension is exerted on the upper end of the casing whereby the point at which the pipe is stuck in the well is obtained, and subsequently at this point or immediately above and adjacent this point the casing is cut and the upper free end recovered.

What is desired to be claimed and be secured by Letters Patent are:

A method for recovering the maximum free portion of a string of pipe made up of sections fastened together at their respective ends by collars which comprises the steps of suspending an assembly including a collar locator and a jet casing cutter on a flexible wireline in a borehole, moving said assembly in said borehole by means of said wireline to sequentially position said collar locator at a series of said collars and sequentially engaging said collar locator with each of said collars, exerting a selected tension on said wireline while said collar locator is engaged with each of said collars, registering said tension on said wireline, exerting tension on the upper end of said string of pipe while maintaining said selected tension on said wireline, registering the resulting tension change on said wireline, locating the collar next above the collar at which there is no change registered in the tension exerted on the wireline, cutting said pipe by means of said jet casing cutter approximately at said located collar to free the portion of said string of pipe above said located collar and recovering said free portion of said string of pipe.

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