

July 21, 1964

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3,141,688

STOP COLLAR

Filed Jan. 9, 1961

3 Sheets-Sheet 1

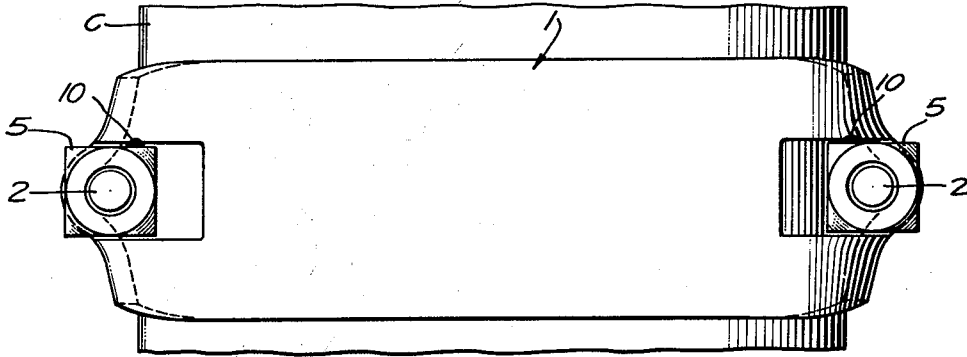


FIG. 1.

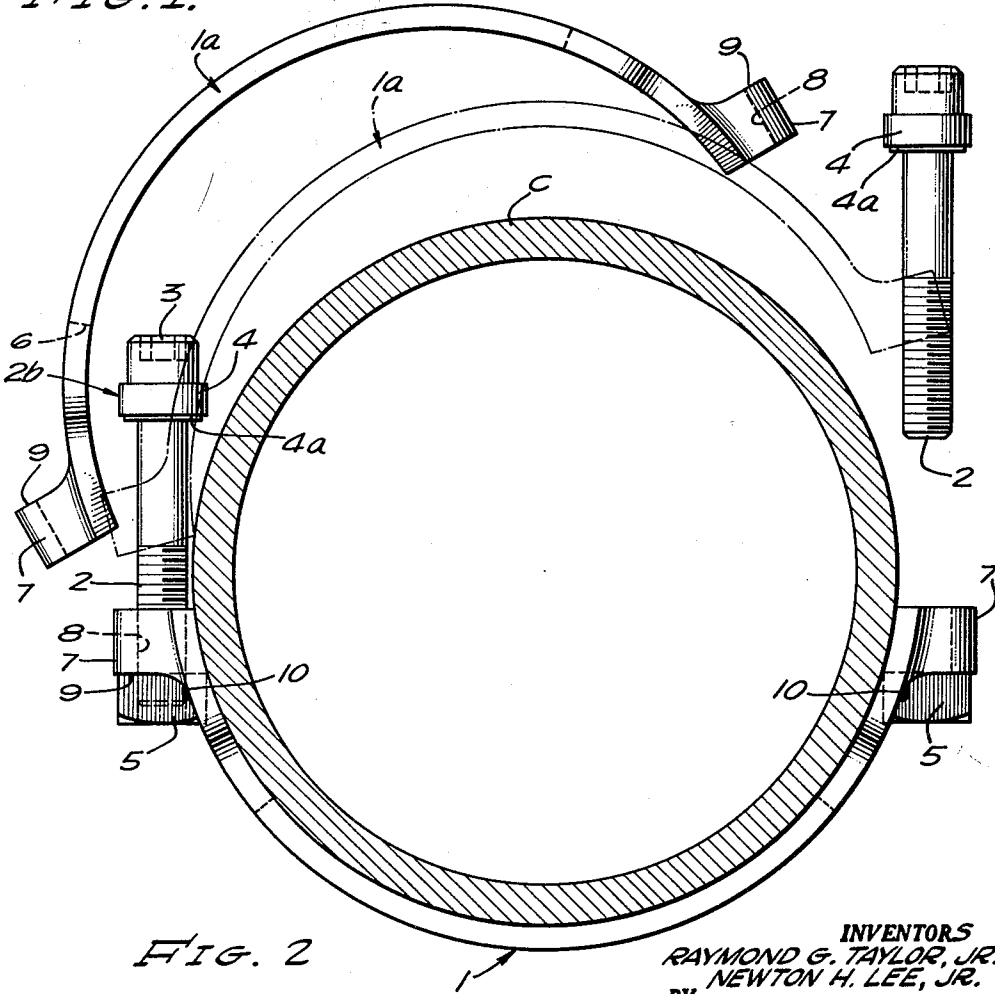


FIG. 2

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3 Sheets-Sheet 2

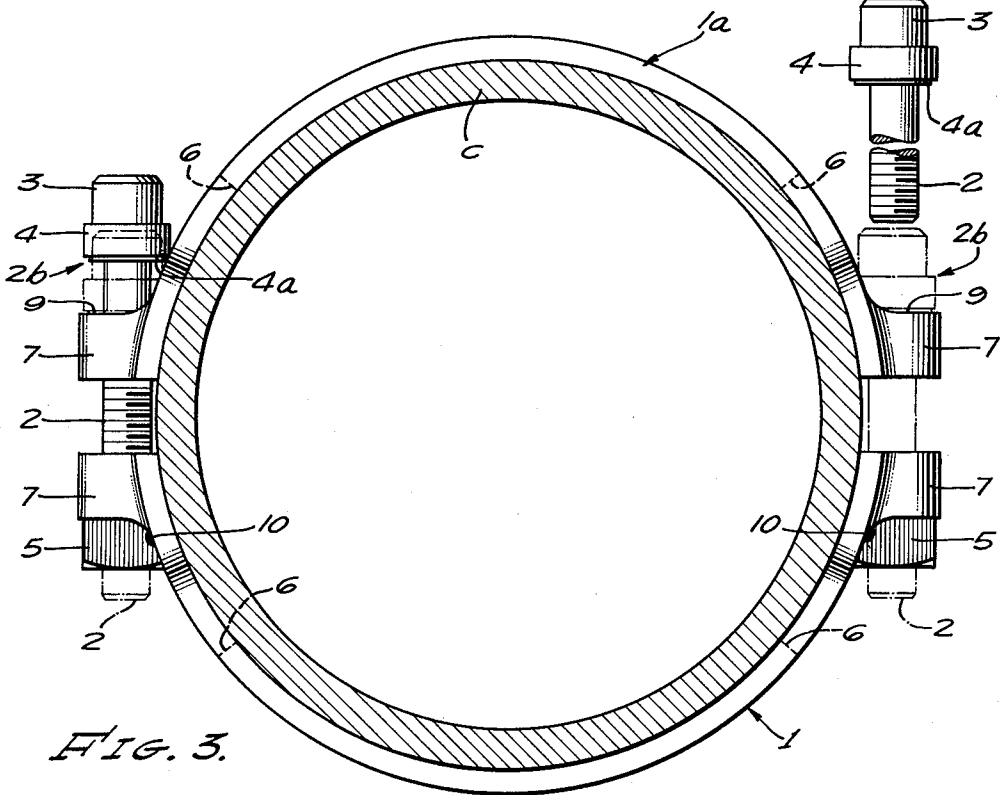


FIG. 3.

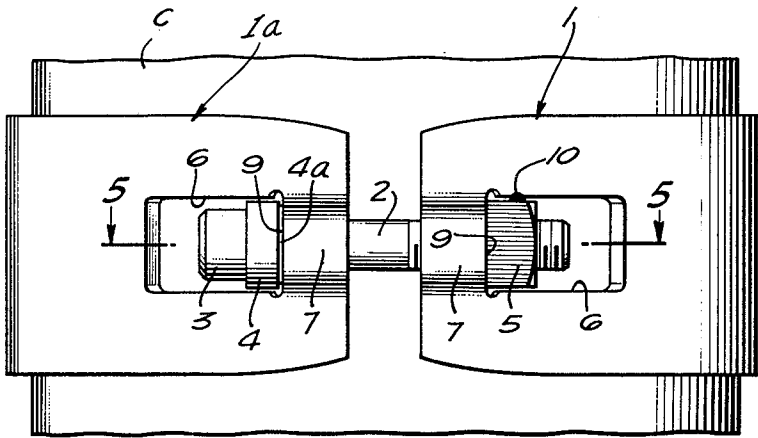


FIG. 4.

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3 Sheets-Sheet 3

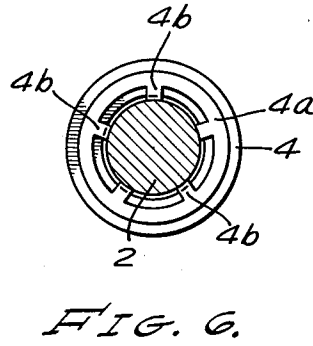
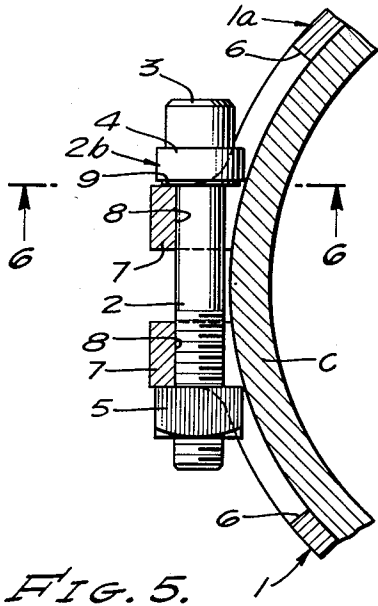


FIG. 5.

FIG. 6.

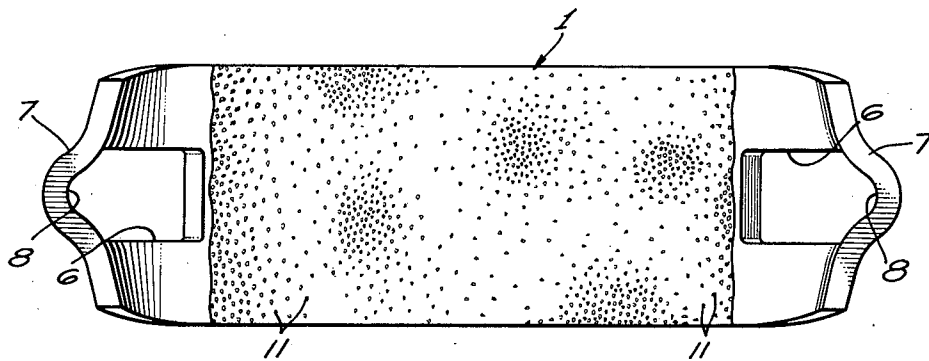


FIG. 7.

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3,141,688

STOP COLLAR

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Filed Jan. 9, 1961, Ser. No. 81,421

4 Claims. (Cl. 287—52.03)

The present invention relates to stop collar devices and more particularly to a stop collar device which is applicable to well casing with facility and is so constructed as to be inexpensive to manufacture, but which is effective to withstand or resist axial slippage along the well casing, without requiring that the stop collar device be welded to the casing or that the casing be objectionably marked or notched by conventional anchorage means for such stop collars.

In the completion of oil and gas wells it frequently is desirable to mount upon well casing to be set in the well, devices for centralizing the well casing within the well bore, as well as devices for removing the drilling fluid sheath from the well bore to enable a more effective cement bond with the earth foundation through which the well bore extends. A well casing centralizing device of the type referred to above is illustrated in U.S. Patent No. 2,738,019, granted March 13, 1956, to A. E. Atkinson. A well bore wall scratching device as referred to above is illustrated in the U.S. Patent No. 2,918,974, granted April 14, 1959, to Horace A. Johnson.

In the practical application of such casing centralizer and borehole wall scratching devices, it is necessary that they be retained on the well casing against relative axial movement or for limited relative axial movement. In accomplishing this it is the practice to mount on the well casing adjacent such centralizers or scratchers, stop collar devices such as generally contemplated by the present invention. However, production of an appropriate stop collar involves certain considerations which render the task quite difficult of accomplishment; for example, the effect of competition in marketing the centralizers and wall scratchers as well as the stop collars results in the requirement that the stop collar devices be quite inexpensive; but notwithstanding this the stop collars must be capable of sustaining axial loads of a number of thousands of pounds without slippage on the casing; yet purchasers of the stop collars desire that the stop collars not be anchored to the well casing in such a fashion as to cause stress concentrations in the casing material, particularly in the case of modern-day relatively high tensile strength well casings which have significant notch-sensitivity rendering the casing susceptible of breakage.

Accordingly, it is a primary object of the present invention to provide a stop collar device which meets the requirements expressed above and which is weldlessly applicable to well casing without creating surface notches or otherwise causing stress risers in the well casing.

A more specific object is to provide a stop collar device comprising half parts interconnectible in opposed relation about the well casing by threaded fasteners so as to be forcibly drawn by the threaded fasteners into frictional engagement with the well casing.

Another object is to provide a stop collar device according to the next preceding objective, wherein one of the threaded fasteners constitutes a lug carried by one end of one of the collar half parts and engageable by one end of the other collar half parts in an extremely simple fashion, so as to facilitate application of the collar to well casing intermediate the ends of the well casing.

Other objects and advantages of the invention will be hereinafter described or will become apparent to those

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skilled in the art, and the novel features thereof will be defined in the appended claims.

In the accompanying drawings:

FIG. 1 is a side elevational view showing a stop collar device made in accordance with the invention, as applied to well casing;

FIG. 2 is a view showing the stop collar parts in plan and showing in broken lines the progressive application of one of said parts to the well casing, the latter shown in horizontal section;

FIG. 3 is a view corresponding to FIG. 2, showing the stop collar device fully engaged about the well casing;

FIG. 4 is a side elevational view showing the stop collar device applied to well casing, this view being displaced 90° from the side elevational view shown in FIG. 1;

FIG. 5 is a fragmentary horizontal sectional view as taken on the line 5—5 of FIG. 4;

FIG. 6 is an enlarged detail view in vertical sectional as taken on the plane of line 6 through the fastener device of FIG. 5, and

FIG. 7 is a detailed view in inside elevation of one of the stop collar half parts.

Like reference characters in the several views of the drawings and in the following description designate corresponding parts.

Referring first to FIGS. 1 and 4, it will be observed that the stop collar device of the present invention comprises a pair of identical body half parts 1, 1a of arcuate form disposable about a length of well casing C and interconnectible by means of threaded screw fasteners 2, 2. Each of the fasteners 2 has a head 3, with which is engaged a washer 4. The washer 4 is held on each screw to facilitate handling, as by means of a retainer 4a, which is preferably a sheet metal annular element having resilient holding fingers 4b projecting radially inward for engagement with the stem of the fastener 2, as best seen in FIG. 6. At the lead end of the respective fasteners 2 they are threadedly engageable in nuts 5.

The washers 4 and nuts 5, in a manner which will be hereinafter described in detail, engage the ends of the collar body parts 1 and 1a in such a manner as to draw the ends of the body parts together at opposite sides of the well casing, so that the body half parts securely frictionally grip the well casing to prevent longitudinal movement of the assembled collar along the well casing.

Each of the body parts 1 and 1a is preferably stamped out adjacent its ends to provide a circumferentially extended slot 6 at each end of the respective body parts. In addition, each body part is formed at each end with a radially outwardly extended arcuate abutment 7, having an opening 8 leading into the slot 6. The fasteners 2 may extend through the openings 8 with the washer 4 and nut 5 on the respective fasteners engageable with the inside radially extended surface 9 of the projections 7, and with the fasteners disposed substantially tangentially with respect to the collar.

It will be noted that the slots 6 have a dimension axially of the collar parts greater than the diameter of the washers 4 and greater than the width of the nuts 5, so that certain procedural advantages in the application of the stop collar to well casing are realized. In this connection, as best seen in FIGS. 2 and 3, the nuts 5 are appropriately secured in the slots 6 of the collar half part designated 1, as by tack-welding at 10, or by other appropriate means. As illustrated in FIG. 2, one of the threaded fasteners 2 is preferably partially threaded into one of the nuts 5, and since the latter nut 5 is connected to the body part 1 shown in FIG. 2, the head of this fastener 2 and the washer 4 provide a lug generally designated 2b on the fastener body which extends substantially tangential to the casing.

Thus the complementary body half part 1a may be

moved towards the casing C from the position shown in full lines in FIG. 2 to the position shown in broken lines in FIG. 2, with the result that the lug 2b will pass through the slot 6 in the end of body part 1a so as to permit movement of the body half part 1a into engagement with the well casing C as shown in FIG. 3. Subsequently, the other fastener 2 may be passed through the opening 8 in the projection 7 in the other end of the body part 1a and threaded into the nut 5, as shown in broken lines in FIG. 3, following which both of the screw fasteners may be tightened to securely mount the assembled collar to the well casing C.

It has been found that with this construction of the projections 7 on the ends of the collar half sections, the projections may be made of substantial sectional strength to successfully withstand stress due to tightening of the fasteners 2 without significantly yielding, even though the fasteners be tightened to the extent of on the order of 600 inch pounds of torque.

Moreover, it will be observed that the maximum radial projection of the assembled collar is not at the abutments 7, but at the ends of the fastener. Accordingly, the assembled collar will have a minimum radial projection so as to avoid interference with centralizer springs of casing centralizers as shown in the above-referred to U.S. Patent No. 2,738,019.

Since the collar parts are applicable to the well casing between the ends of the latter, it is not necessary that the collar be applied over the end of the casing so that installation is facilitated. Such installation is also facilitated by the forming of the body parts 1 and 1a with slots 6 which enable the application procedure illustrated in FIGS. 2 and 3, as well as by tack-welding the nuts 5 to the body part 1 to enable mutual partial connection of one of the fasteners 2 to the body part 1, thus enabling the collar to be shipped partially assembled, as shown in FIG. 2, with consequent savings in installation time.

If desired, the inside face of the respective body sections may be provided with particles of grit as indicated at 11, for the purpose of enhancing gripping action of the stop collar device on the well casing in accordance with the co-pending application of Raymond G. Taylor, Jr., Serial No. 81,321, filed concurrently herewith.

While the specific details of an illustrative embodiment of the invention have been herein shown and described, changes and alterations may be resorted to without departing from the spirit of the invention as defined in the appended claims.

We claim:

1. A stop collar comprising: a pair of arcuate body parts disposable about a longitudinally extended member with the respective ends of the body parts in opposed relation, said body parts each being provided at its opposite ends with a projection, one of said body parts having internally threaded means at each of its end projections for the reception of a threaded fastener, said fastener having radially enlarged abutment means at one end, the other of said body parts having circumferentially extended radial slots at its opposite ends adjacent its end projections and of a width greater than the abutment means on said threaded fastener, the latter end projections each also having an opening to accommodate said threaded fastener, said opening being alignable with said internally threaded means at the ends of said one of said body parts and being unobstructed inwardly to allow the lateral movement of said latter end projection onto said fastener intermediate its ends.

2. A stop collar comprising: a pair of identical body half parts of arcuate form disposable about a longitudinally extended member in opposed relation; each body half part having an outstanding abutment at its opposite ends provided with an opening for the passage of a threaded fastener, a slot at each end adjacent said abutment; one of said body half parts having fixed in the slot at each of its ends a nut having its threaded bore aligned with said opening through the respective abutments; and a pair of threaded fasteners engageable at one end in the respective nuts and having at their other ends enlarged abutment means of a size to fit through said slots and to abut with said abutments of the other of said body half parts.

3. A stop collar as defined in claim 2, wherein said abutments are in the form of arcuate portions projecting outwardly from the ends of the body half parts and defining said opening therein.

4. A stop collar as defined in claim 2, wherein said nuts are welded in said slots of said one body half part.

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