Jan. 29, 1952 A. B. JOHNSON 2,584,022

SURFACE PIPE BRACING AND CENTERING MEANS

Filed Sept. 4, 1947 2 SHEETS—SHEET 1

FIG. 1

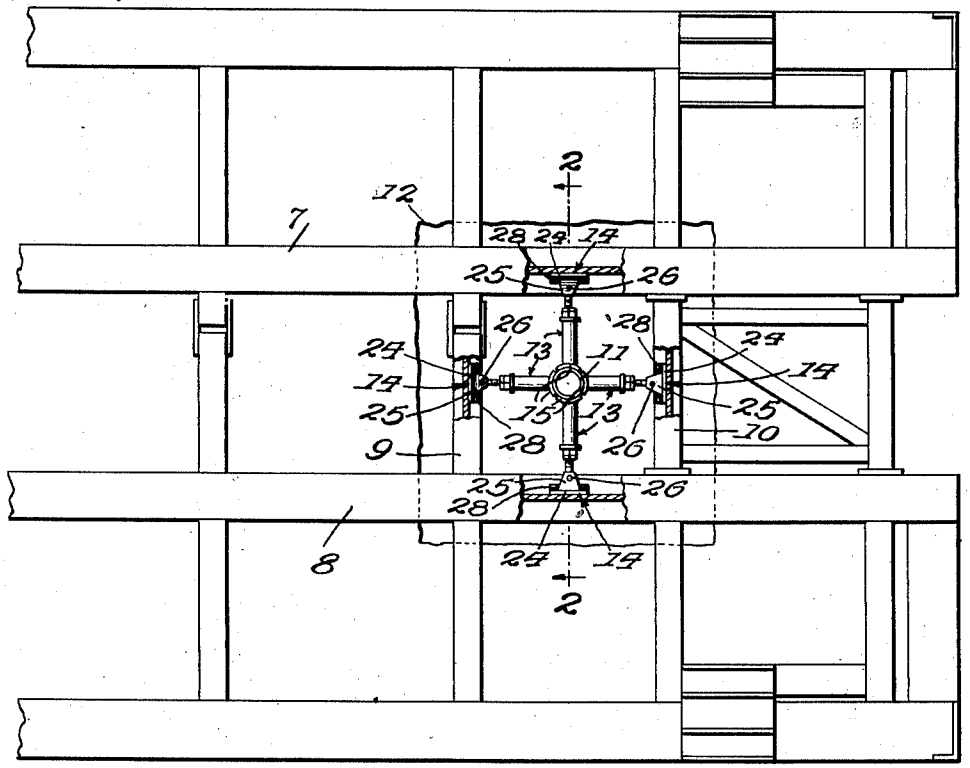
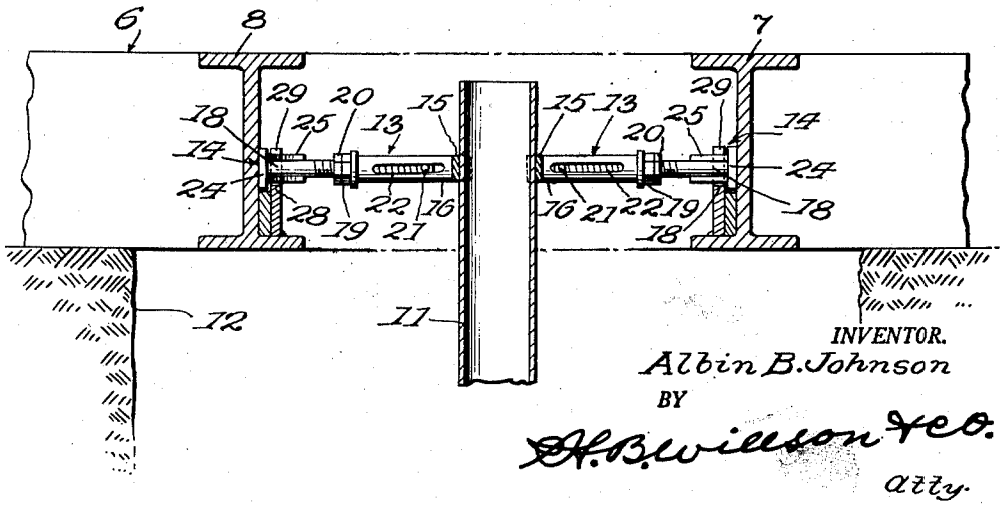


FIG. 2



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FIG. 3

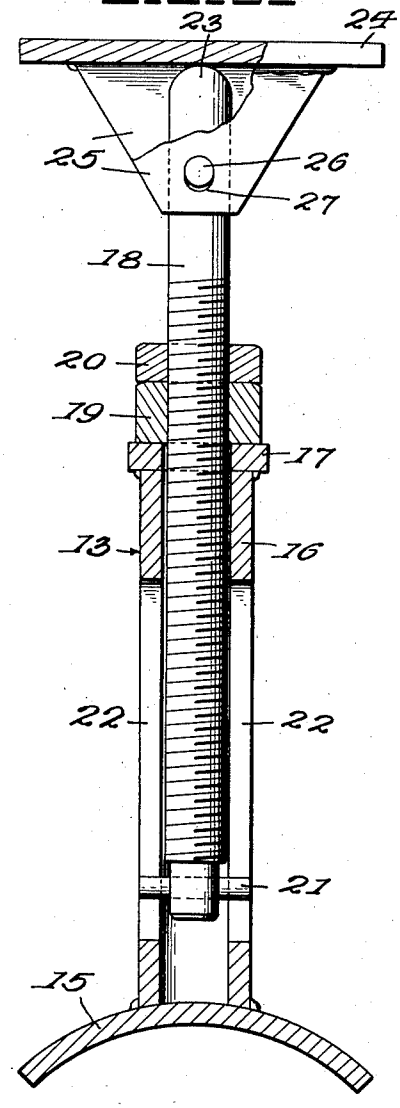


FIG. 4

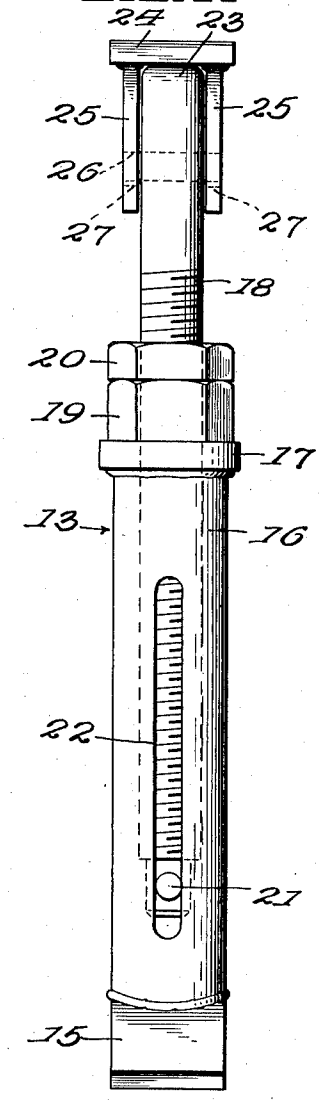
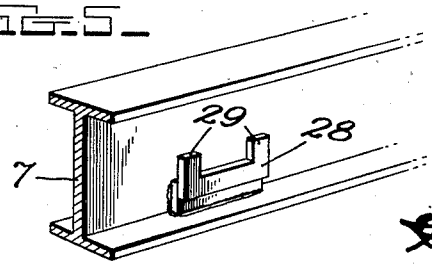


FIG. 5



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UNITED STATES PATENT OFFICE

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SURFACE PIPE BRACING AND CENTERING MEANS

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4 Claims. (Cl. 166—4)

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In the process of drilling an oil well with the hydraulic rotary method, it is necessary to prevent contamination of the surface water with the mud used in drilling and with salt water found at lower depths. For this purpose, several joints of casing are placed in the hole to a depth of from 150' to 1500' and this surface casing is cemented in place. The upper end portion of this casing is within the usual "cellar" (a pit dug in the ground about 6' square and 6' deep), and, therefore, approximately 7' of this casing projects above the bottom of said cellar. It is necessary to rigidly brace this upper end portion of the surface casing with respect to the derrick base frame. Otherwise, the vibration produced by the kelly and the rotating drill pipe will whip and knock the surface casing loose, not only resulting in inaccurate drilling but causing trouble (drill stem joints striking upper end of surface casing) each time the drill pipe must be withdrawn from the casing and re-inserted, and these operations must be performed approximately every 200' or 300' in order to replace worn drilling bits.

Heretofore, it has been customary to brace the upper end of the surface casing with wooden timbers or by means of steel braces welded to the derrick base frame, but the former method is far from satisfactory and the latter requires the presence of a welder and welding equipment when starting the well and again upon completion.

It has been the object of my invention to provide new and improved means for effectively bracing the surface casing to the derrick base frame, of such construction that it may be quickly and easily set in operative position, and may be released and moved aside with equal facility, without the use of any special equipment or tools, and without the services of a welder.

Fig. 1 is a fragmentary top plan view, partly in section, showing the invention operatively associated with a portable derrick base frame and a surface casing.

Fig. 2 is an enlarged vertical sectional view, partly in elevation, substantially on line 2—2 of Fig. 1.

Fig. 3 is a further enlarged longitudinal section, partly in elevation, showing one of the adjustable struts.

Fig. 4 is a side elevation of one of the struts as viewed at a right angle to Fig. 3.

Fig. 5 is a fragmentary perspective view of one of the forks used in detachably connecting the struts with the derrick base frame.

In the drawings above briefly described, a preferred construction has been illustrated, and

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while that construction will be rather specifically described, it is to be understood that variations may be made within the scope of the invention as claimed.

The invention has been shown in connection with the base frame 6 of a portable derrick, and said base frame embodies I-beams or other horizontal frame members 7, 8, 9 and 10 to jointly surround a surface casing 11 projecting upwardly from the bottom of a so-called cellar 12.

I provide four longitudinally adjustable struts 13 which are detachably and pivotally coupled at 14 to the frame members 7, 8, 9 and 10 respectively, and are provided with suitably shaped seats 15 to engage the surface casing 11, the coupling or mounting means 14 being so located that the struts 13 will occupy horizontal positions in which they extend radially from the casing 11, when set in position to brace the casing to the base frame 6.

As shown more particularly in Figs. 3 and 4, each adjustable strut 13 includes an elongated tubular body 16 having the outwardly-facing, transversely-curved seat 15 welded or otherwise secured to its inner end and having its outer end open, said outer end having a thrust collar 17 welded or otherwise secured thereto. A screw 18 extends into the tubular body 16 through its open outer end and is preferably provided with a 90° box thread. A nut 19 is threaded on the screw 18 and abuts the thrust collar 17, and a lock nut 20 is also threaded on said screw to abut the outer end of said nut 19. The strut may thus be readily extended or contracted in length. Suitable provision is made to hold the screw 18 against rotation while the nut 19 is being turned to extend or retract the strut, and while locking or releasing the lock nut 20. In the present showing, the screw 18 is provided with a diametrical pin 21, the ends of which are received in longitudinal slots 22 formed in the body 16. The outer end of the screw 18 is preferably rounded as shown at 23 and abuts the inner side of a flat head-plate 24, said head-plate having inwardly projecting flanges 25 which terminate in inwardly spaced relation with its ends and straddle the screw. These flanges and the screw are pivoted together by means of a pin 26 which extends diametrically through said screw and has its ends received in slots 27 in said flanges. By having the rounded outer ends of the screw 23 abut the head-plate 24, strain is taken from the pin 26 and the flanges 25. These flanges may of course be welded or otherwise secured to the plate 24.

Upwardly open forks 28 are welded or otherwise

permanently secured to the inner sides of the frame members 7, 8, 9 and 10 with their furcations 29 spaced apart sufficiently to receive the flanges 25 of the head-plate 24, said furcations being also sufficiently spaced from said frame members to permit reception of said head-plate 24 between said frame members and furcations. It will be seen upon reference to Fig. 5 that the fork 28 comprises a rectangular plate which is welded to the base flange and web of an I beam forming one of the frame members 7, 8, 9 or 10 and which carries a U-shaped plate having a notch in its upper edge, so that upwardly extending furcations 29 are spaced horizontally from the web of the beam. Thus, the outer ends of the adjustable struts 13 are detachably connected with the base frame 6 and moreover are pivotally connected therewith (due to the pin 26). Thus, when the struts are not in use, they may be readily swung aside. When they are to be used, they are positioned as seen in Fig. 1 and adjusted to center the surface casing 11 with respect to the rotary, and to rigidly brace said casing to the derrick base frame. During transportation of the machine, the struts may of course be removed and carried in some safe way to prevent loss. After the struts have been adjusted to proper position, they are locked against possible loosening by means of the lock nuts 20.

From the foregoing, taken in connection with the accompanying drawings, it will be seen that novel and advantageous provision has been made for attaining the desired end, and while preferences have been illustrated, attention is again invited to the possibility of making variations within the scope of the invention as claimed.

1. In combination with the bese of a well drilling derrick, said base having frame member spaced apart to jointly surround the upper end of a surface casing; a plurality of longitudinally adjustable, horizontal struts for radial disposition around the surface casing, the inner ends of said adjustable struts having means to engage the casing, the outer ends of said adjustable struts being provided with flat pivoted heads projecting horizontally in oppostite directions therefrom and abutting the inner sides of said frame members of said base, and upwardly forked retainers fixed on the inner sides of said frame members in spaced relation thereto, said retainers straddling said adjustable struts at the inner sides of said heads, said retainers and the pivots of said heads being so positionally related that said retainers will not interfere with swinging of said struts upon said pivots when said struts are not in use.

2. In a device of a class described, an adjustable strut comprising an elongated tubular body having an outwardly-facing, transversely-curved seat rigidly secured to one end of said body, to engage a surface casing, a screw extending slidably into said tubular body through the other end thereof, an adjusting nut threaded on said screw and abutting said other end of said tubular body, the latter having between its ends opposed, longitudinally extending slots, a transverse pin the inner end of said screw having its ends slidable in said slots for holding said screw and body against relative rotation, a head-plate transverse to the outer end of said screw, two flanges secured to said head-plate and projecting inwardly therefrom at opposite sides of said screw, and pivot pin extending through said flanges and screw to pivotally connect said head-plate and screw, said flanges having opposed slots to receive the ends of said pivot pin, said slots being arranged to permit the outer end of said screw to abut the inner side of said head-plate when said screw is perpendicular to the plane of said head-plate.

3. In a device of a class described, an adjustable strut comprising an elongated tubular body having an outwardly-facing, transversely-curved seat rigidly secured to one end of said body, to engage a surface casing, a screw extending slidably into said tubular body through the other end thereof, an adjusting nut threaded on said screw and abutting said other end of said tubular body, the latter having between its ends opposed longitudinally extending slots, a transverse pin in the inner end of said screw having its ends slidable in said slots for holding said screw and body against relative rotation, a head-plate transverse to the outer end of said screw, two flanges secured to said head-plate and projecting inwardly therefrom at opposite sides of said screw, and a pivot pin extending through said flanges and screw to pivotally connect said head-plate and screw.

4. In combination with the base of a well drilling derrick, said base having frame members spaced apart to jointly surround the upper end of a surface casing; a plurality of longitudinally adjustable, horizontal struts for radial disposition around the surface casing, the inner ends of said adjustable struts having means to engage the casing, the outer ends of said adjustable struts being provided with flat pivoted heads projecting in opposite directions from the longitudinal axes of said struts and abutting the inner sides of said frame members of said base, and upwardly forked retainers fixed on the inner sides of said frame members in spaced relation thereto, said retainers straddling said adjustable struts at the inner sides of said heads, said retainers and the pivots of said heads being so positionally related that said retainers will not interfere with swinging of said struts upon said pivots when said struts are not in use.

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