The present invention relates to gas and oil well casing head assemblies. It is an object of the present invention to provide casing head assemblies adapted to be quickly and easily assembled and disassembled in relatively inaccessible positions.

Another object of the present invention is the provision of such assemblies which will be relatively simple and inexpensive to manufacture, easy to operate, maintain and repair, and rugged and durable in use.

Other objects and features of the present invention will become apparent from a consideration of the following description, taken in connection with the accompanying drawing, in which:

FIGURE 1 is a fragmentary elevational view, partly in section, of a casing head assembly according to the present invention; and

FIGURE 2 is a plan view of the structure shown in FIGURE 1.

Referring now to the drawing in greater detail, there is shown a casing and oil well casing head assembly indicated generally at 1 and including a casing support 3 comprising a backup ring adapted to rest on and be supported by a suitable annular supporting surface. Casing support 3 has downwardly converging conical inner surfaces 5 which provide backing for a plurality of wedge-shaped slips 7 having complementarily inclined outer surfaces, so that as slips 7 descend in sliding contact with conical surfaces 5, the generally vertical inner surfaces of slips 7 converge to grasp a length of casing 9 between them. To improve the grasp, the inner surfaces of slips 7 are roughened as by horizontal grooves 8.

Casing head 15 terminates a short distance above support 3 in an upper end 11 which has a smoothly cylindrical outer surface snugly slideably received in a smoothly cylindrical bore 13 in the lower end of casing head 15. Bore 13 terminates upwardly in a horizontal annular shoulder 17 to limit relative telescoping movement of upper end 11 and casing head 15. Shoulder 17 is of a width equal to the thickness of casing 9, so that the interior of casing 9 forms a smooth continuous curvature of the general contour of the bore of casing head 15 apart from the enlarged diameter cylindrical bore 13 in the lower end thereof.

The side walls of bore 13 are provided with a plurality of vertically spaced horizontally disposed radially inwardly opening annular recesses 19, in each of which is disposed an O-ring 21 of a thickness slightly greater than the depth of its associated recess. O-rings 21 thus project slightly radially inwardly from the contour of bore 13 and are resiliently deformed into their associated recesses 19 upon mating sliding movement of end 11 and casing head 15. In assembled relationship, O-rings 21 seal the joint between the casing and the casing head.

Casing head 15 is provided with a pair of oppositely disposed outlet ports 23 which are screw-threaded 25 with which are screw-threaded received outlet lines 25 and 27 for the discharge of casing head gas.

An upper edge portion 29 of casing support 3 is provided with exterior screw threads; and an interiorly screw-threaded union nut 31 is in screw-threaded engagement with these exterior screw threads of the casing support. Union nut 31 is provided at its upper end with a radially inwardly extending flange 33 which on its underside bears against the upper edge of an annular shoulder 35 integral with casing head 15. It is to be noted that shoulder 35 is disposed below nipples 23 and above upper edge portion 29.

The operation of the device will now be apparent. When a length of casing 9 is run into the well and supported on support 3 by the gripping and wedging action of slips 7, the upper end of the casing will extend well above the support. In the past, it has been customary to cut off the casing a short distance above the support, and then provide screw threads only on the upper end of the casing to receive and interengage with the casing head. This, however, has necessitated the formation of screw threads in an ordinarily inaccessible location, and attempts to do so have occasioned a great deal of difficulty. The simplest solution to the problem heretofore has been simply to weld a screw-threaded nipple onto the freshly cut upper end of the casing just above the casing support. By the present invention, however, the job of assembling the casing head assembly is greatly simplified. It is necessary only to cut off the upper portion of the casing, leaving end 11 projecting a short distance above the casing support. The cutting operation may be performed by use of equipment as disclosed in my copending application entitled “Gas and Oil Well Tubing and Cutter Assembly,” filed under even date herewith. Use is then made of the plain cylindrical outer surface of upper end 11 by means of the casing head assembly of the present invention. The casing support having external screw threads, it is necessary only to lower the casing head over the freshly cut end of the casing, and to engage the union nut with the crew threads on the casing support. Upon turning the union nut, the casing head is drawn down on the freshly cut upper end of the casing, that upper end sliding into bore 13 until it contacts shoulder 17, whereupon the assembly is complete. To disassemble the structure, turning of the union nut in the opposite direction disengages the union nut from the screw threads of the casing support, whereupon the casing head may be pulled. Of course, a second annular shoulder similar to shoulder 35 but spaced thereabove a distance equal to the width of flange 33 may be provided, so that uncoupling turning movement of union nut 31 forcibly removes the casing head from the upper end of the casing. But in the illustrated embodiment, the union nut simply rides in the free space between shoulder 35 and nipples 23 upon uncoupling turning movement thereof.

From a consideration of the foregoing disclosure, it will be obvious that the initially recited objects of the present invention have been achieved.

It is to be understood that the appended claims are to be accorded a range of equivalents commensurate in scope with the advance made over the prior art.

What is claimed is:

A gas and oil well casing head assembly comprising a casing support having an externally screw-threaded upper edge portion, means supporting a length of casing in the casing support with the casing terminating a short distance above said means in an upper end portion having a smooth cylindrical outer surface, a casing head having a smooth cylindrical bore in its lower end with said cylindrical outer surface of the casing disposed slidably in the bore, said bore having at least one annular radially inwardly extending, O-ring 21 sealing each said at least one recess and in sealing engagement with the casing, said bore terminating upwardly in an inwardly directed abutment in contact with the upper end of the casing when the upper end of the casing is fully inserted in the casing head, an external radial shoulder on the casing head above the upper edge of the casing support and below said abutment and spaced a substantial distance above the lower edge of the casing head, said externally screw-threaded upper edge portion of the casing support being spaced a substantial distance...
above the lower edge of the casing head and extending radially inwardly beyond the radially outermost portion of said external radial shoulder on the casing head, the radially inner surface of said upper edge portion being spaced a substantial distance radially outwardly from the radially outer surface of the casing head adjacent said lower edge thereof, and means for exerting a uniform force on said radial shoulder comprising a union nut having internal screw threads in engagement with the external screw threads of the casing support and having an inwardly directed flange above and in contact with said radial shoulder to draw the casing head down upon the casing upon rotation of the union nut in one direction and to release the casing head from securement with the casing upon rotation of the union nut in the other direction, the casing and the casing head overlapping each other a vertical distance which is substantially greater than the vertical distance by which the casing support and the union nut overlap each other when the casing is fully seated in the casing head, so that upon assembly, the casing enters the casing head a substantial distance before the screw threads of the union nut and the casing support can engage each other, the union nut when in screw-threaded engagement with the casing support being coaxial with the casing and the casing support and the casing head and bearing evenly on said radial shoulder thereby to avoid canting the casing head relative to the casing when the upper end of the casing is in the bore above said radial shoulder.

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