Feb. 7, 1956 M. C. DAVIS 2,733,938

PIPE HOLDING AND PACKING SLIP

Filed Sept. 17, 1953

Fig. 1.

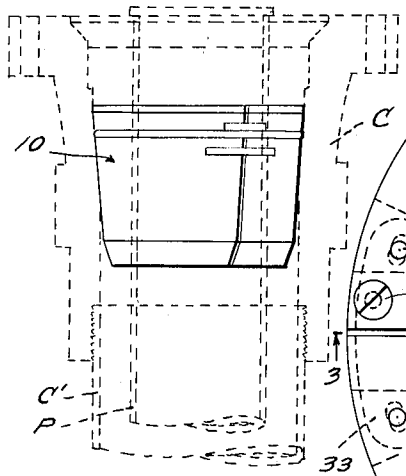


Fig. 2.

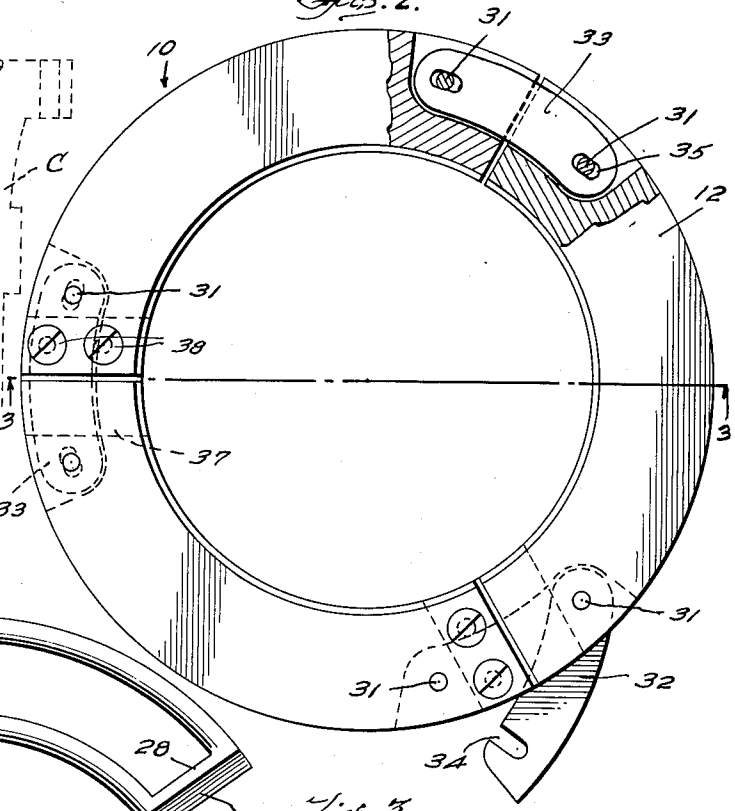


Fig. 5.

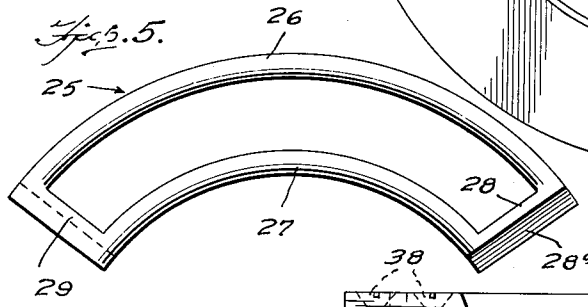


Fig. 3.

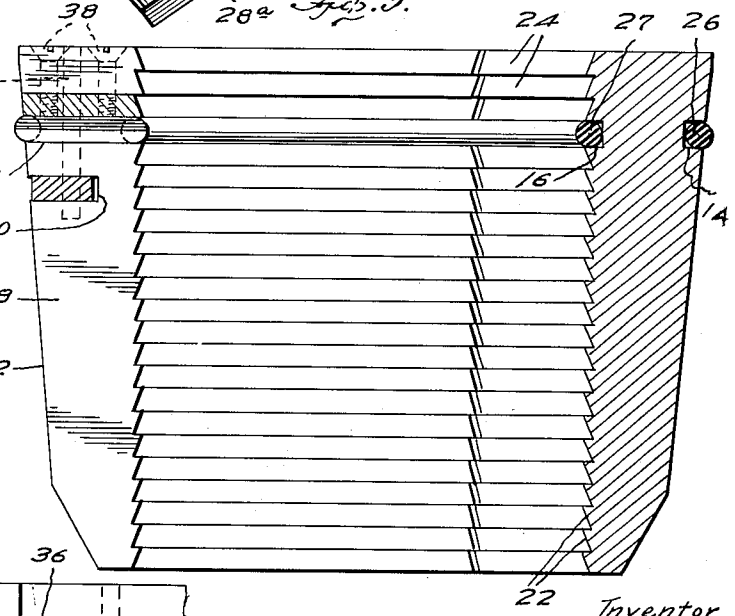


Fig. 6.

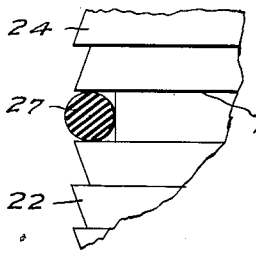
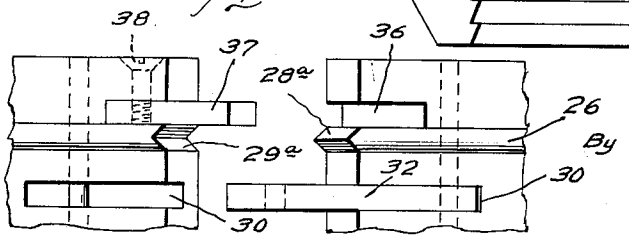


Fig. 4.



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PIPE HOLDING AND PACKING SLIP

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5 Claims. (Cl. 285—22)

This invention relates generally to improvements in deep-well equipment and is directed particularly to improvements in suspension slips used in casing heads.

A particular object of the present invention is to provide a novel and improved suspension slip having as an integral part thereof packing elements for packing off the space between the casing head and the production casing or well pipe.

Another object of the invention is to provide an improved suspension slip wherein each slip making up the well pipe encircling unit carries a packing element which has a portion positioned along the outer surface of the slip and another portion positioned against the inner surface of the slip, said portions engaging respectively with the casing head and with the production casing or well pipe when the slip is in operative position.

A still further object of the invention is to provide a packing slip assembly wherein each of the slips has an internal and an external packing groove or channel and carries a removable packing element having inner and outer portions engaging in the inner and outer channels and having end portions disposed across opposite end edges of the slip, the said end portions of the packing element being formed whereby an end of one element interlocks or inter-engages with an end of the adjacent element.

Other objects and advantages of the invention will become apparent as the description of the same proceeds and the invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawing forming a part of the specification, with the understanding, however, that the invention is not to be limited to the exact details of construction shown and described since obvious modifications will occur to a person skilled in the art.

In the drawing:

Figure 1 is a view illustrating in dotted outline a casing head, a casing connected therewith and a production casing or well pipe therein showing the position of the improved slip assembly of the present invention with respect to these parts.

Figure 2 is a view in top plan of the slip assembly, with portions in section and showing the securing latch in open position.

Figure 3 is a sectional view taken transversely of the slip assembly substantially on the line 3—3 of Figure 2.

Figure 4 is a detailed view looking at the upper portion of the side of the assembly in which two adjacent parts of the slips are latched together and showing such parts in separated relation.

Figure 5 is a view in plan of one packing unit carried by a slip.

Figure 6 is a detail view showing on an enlarged scale a portion of a packing channel and a portion of the packing section therein.

Referring now more particularly to the drawing, Figure 1 illustrates the conventional position of the slip unit

in a well casing head, the casing head being designated C and having connected therewith in the conventional manner the surface casing which is designated C' and through which passes the production casing or well pipe which the slips support and which is designated P.

The improved slip unit of the present invention is shown in position within the casing head C and generally designated **10**.

As shown in Figure 2, the slip unit comprises the three arcuate slip bodies **12** which, when arranged in edge-to-edge relation to form the complete unit, define a circular sleeve or collar as in the usual or conventional slips.

The slips **12** are externally tapered as shown, and in accordance with the present invention, each slip is provided adjacent to its top with an outside packing channel **14** and an inside packing channel **16**. These outside and inside channels **14** and **16** are connected at their adjacent ends across the vertical side edges or faces **18** of the slip in which they are formed, by the short transverse channels **20**. Thus each slip, adjacent to its top end is provided with a completely encircling packing channel or recess made up of the individual channels **14**, **16** and **20** and these channels are all in a common plane perpendicular to the longitudinal axis of the slip unit, when the slips are in assembled relation, as will be readily apparent from the description and the illustration.

As shown in Figure 3, each of the slips **12** is provided in its inner face from the bottom up to the inside packing channel **16**, with the upwardly pointing wickers or well pipe gripping teeth **22** and above the inside channel **16** are the wickers **24** in which the edges or teeth have the points directed downwardly. In other words, the wickers above the packing channel **16** are inverted with the bottom side cut at right angles to the slip body while all of the wickers below the packing groove or channel **16** are cut with the top side at right angles to the slip body, which causes the slips to grip the casing or well pipe P when the slips are lowered into the tapered casing head.

Each of the slips **12** is encircled by a packing unit which is generally designated **25** and which may be made of conventional packing material. This packing unit is in the form of an arcuate frame and comprises the inside and outside bars **26** and **27** which are designed to position respectively in the channels or grooves **14** and **16**, and the transverse short connecting bars **28** and **29** which position in the transverse channels **20** of the slip.

One of the transverse bars **28** of the packing unit is beveled from the top and from the underside to form a tongue **28*a***, while the bar **29** at the opposite end of the unit is recessed to form a groove **29*a*** to receive a tongue **28*a*** of an adjacent packing unit when the slips are in assembled position.

For coupling the slips together into a unit the slips are provided transversely of their meeting edges **18** with matching link slots **30** which are preferably located below the packing grooves or channels **14** and **16** as shown in Figures 3 and 4 and inserted into the slips from the top edge to extend across the slots are the link pins **31**.

The slots **30** when arranged in matching relation in the slip unit receive coupling links, one of which is designated **32** and comprises a latching link, while the remaining links are designated **33** and constitute hinge links. As shown, the latch link **32** has one end pivotally retained in a slot **30** by the pin **31** passing therethrough, while at the opposite end the link **32** is provided with an edge notch **34** which receives the adjacent pin **31** when the link **32** is swung inwardly after the slips have been assembled in the position shown in Figure 2.

The links **33** which comprise hinge links, are provided at their ends with the elongated pin slots **35** and these links when positioned in adjacent slots **30** have the adjacent

pins 31 extended therethrough. Thus the slips are hingedly coupled together by the links 33 so that they can be swung open or apart to be positioned in operative position around the well pipe and when they are swung together they can be locked by the latched link 32 in the manner stated.

In order to prevent the packings from flowing, or blowing out, from between the slips by pressure from below, the following structure is provided.

The slips have formed across their end faces and above the packings, the slots 36 which come into matching relation when the slips are assembled to form the slip unit.

One of the two matching slots has positioned therein a key plate 37 which is held in position by screws 38 and which has a portion projecting beyond the adjacent side face of the slip to enter into the adjacent matching slot 36 when the slips are assembled.

This construction also facilitates the maintenance of the slips in the proper relation and prevents unnecessary strain being applied to the hinge and latch links.

Many and various types of pack-off arrangements are in use in oil well work, but all of them employ separate packing means attached to the slips.

In the present invention as will be readily apparent the packing and slip are provided as a unit so that when the packing unit is placed in position around the well pipe the necessary packing will be automatically set up between the pipe and the slip unit and between the casing head and slip unit. With this construction a saving of time is effected in the assembly of the parts and also the packing and slips can be produced and marketed at a more reasonable figure than is at present the case.

While the illustration and preceding description are directed to the use of the pack-off slips in a casing head for the suspension of the well pipe, it is to be understood that the invention is not limited to this use, as the slips can be used to suspend smaller pipe, such as oil well tubing or the like, or in any location where a suspension and pack-off may be required.

I claim:

1. In a pipe holding and packing slip structure, a plurality of arcuate, exteriorly downwardly tapered, slip elements, means for coupling said slip elements in end-to-end relation, said elements having channels in the inner and outer sides thereof adjacent the top ends of the same, and a packing element encircled about each of said elements with the inner and outer portions seated in said channels and end portions extending across the adjacent ends of the elements engaging with each other, said slip elements having the inner surfaces provided with downwardly inclined teeth above and upwardly inclined teeth below said packing elements.

2. The invention according to claim 1, wherein the packing for each slip is in a single unit in the form of an open arcuate frame which encircles the slip.

3. The invention according to claim 1, wherein the packing for each slip comprises a single open frame unit, the portions extending across the end faces of the slip being formed one as a tongue and the other as a groove.

4. A device of the character stated comprising a plurality of well pipe holding slips having opposing side edge faces, hinge couplings between said faces, each of said slips having packing channels in their inner and outer faces and across their side edge faces, said channels in each slip being joined together at their ends and lying in a common plane, a packing encircling each slip and lying in the joined channels, said slips having matching pairs of slots formed across said opposing side edge faces above and opening into the adjacent side edge face channels, and a key plate secured at one end in one slot of each pair and extending across the opposing edge faces and positioned in the adjacent other slot and functioning to prevent blowing out of the underlying packing.

5. The invention according to claim 4, wherein the packing extending across one end edge face of each slip and the packing extending across an opposing end edge face are formed for interlocking engagement when the slips are in assembled relation.

References Cited in the file of this patent

UNITED STATES PATENTS

1,973,809	Heggem	Sept. 18, 1934
1,979,389	Howard	Nov. 6, 1934
2,493,556	Stone	Jan. 3, 1950