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SAFETY DEVICE FOR CATCHING FALLING
OBJECTS IN WELL BORES
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Fig. 1.

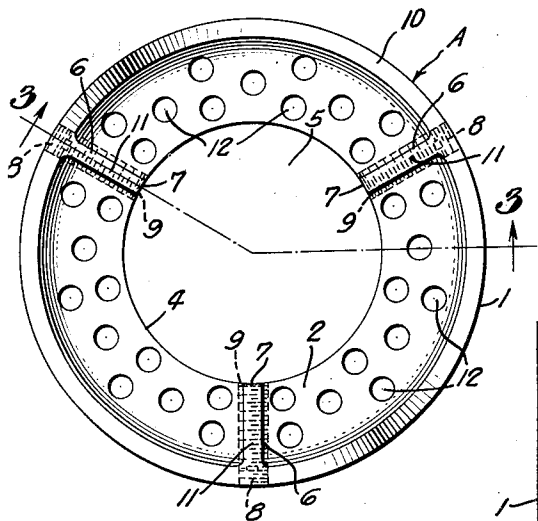


Fig. 3.

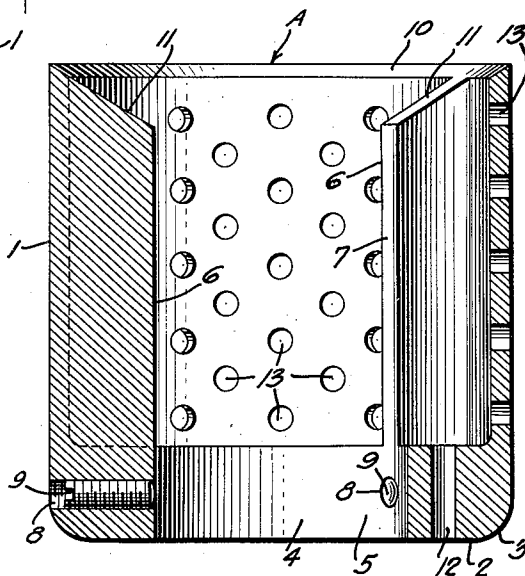
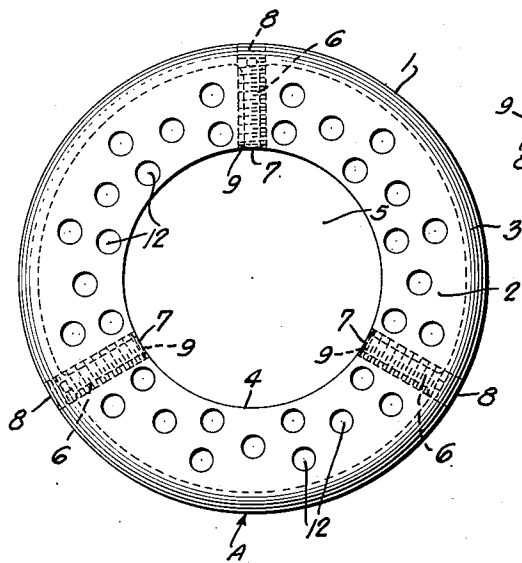


Fig. 2.



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SAFETY DEVICE FOR CATCHING FALLING
OBJECTS IN WELL BORES

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7 Claims. (Cl. 166—1)

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This invention relates to a safety device for catching falling objects in well bores, and more particularly to a new and useful safety device for use with tubing string or drill pipe in well bore casings in connection with the running of packers, fishing tools, or any other tool having an outside diameter of sufficient size to become wedged in a cased well bore by objects being dropped into the well bore, particularly from the surface.

The primary object of the invention is to provide a safety device adapted to be secured to the tubing, pipe or running string immediately above the packer, fishing tool, or other tool, which functions to catch and retain tong keys, bolts, sections of slip segments, hammer heads, or other objects which might be dropped within or into the well bore and cause the hole to be plugged by such objects becoming wedged between the packer or tool and the casing. A further object of the invention is to provide a safety device of the aforementioned character provided with fluid passageways to prevent swabbing action when pulling the string out of the well bore and floating action when passing the string into the well bore.

A further object of the invention is to provide a safety device of the aforementioned type having novel means for supporting the same relative to the pipe or tubing string and so constructed as to direct falling objects thereinto.

Other objects of the invention will become apparent as the description proceeds, reference being made to the accompanying drawing forming a part of the present disclosure, in which:

Fig. 1 is a top plan view of a safety device constructed in accordance with the teaching of my invention;

Fig. 2 is a bottom plan view thereof; and

Fig. 3 is a sectional view taken along the line 3—3 of Fig. 1 looking in the direction of the arrows.

Referring in detail to the drawings, it will be seen that my new safety device A comprises a cylinder or cylindrical side wall 1 connected to an annular bottom wall 2 having an outer, rounded lower edge 3, said bottom wall having an inner circular edge 4 defining an axially extending central opening 5 through which the tubing or running string is adapted to extend in proximity to the edge 4.

A plurality of radially directed webs 6 are integrally or otherwise suitably secured to the cylindrical side wall 1 and the annular bottom wall 2. The inner edges 7 of the webs 6 are prefer-

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ably concave, having the same radius of curvature as the inner edge 4 of the bottom wall 2, and in alignment therewith. In the modification chosen for illustration, three webs 6 are illustrated, said webs being equidistantly spaced 120° apart, although more or less such webs may be used, if desired.

The bottom wall 2 is preferably made of thicker construction than the cylindrical side wall 1, and threaded, radially directed openings 8 are provided in said bottom wall, preferably subjacent and in alignment with the webs 6. A screw 9 is provided in each of the openings 8, said screws being adapted to engage the tubing or running string and maintain the device secured thereto in the desired position.

The upper edge 10 of the cylindrical wall 1 is downwardly and inwardly inclined, preferably at an angle of from 30° to 45°, and the upper edges 11 of the webs 6 are similarly downwardly and inwardly inclined and are preferably aligned with the edge 10. The inclined edges 10 and 11 function to direct falling objects into the interior of the safety device A where they will be retained by the walls 1 and 2.

The bottom annular wall 2 is provided with a plurality of axially extending apertures or passages 12 extending therethrough, and also, preferably, the cylindrical wall 1 is provided with a plurality of radially extending apertures or passages 13 extending therethrough. The passages 12 and 13 are fluid passageways and function to prevent swabbing action when the tubing string is being pulled out of the well bore, and function to prevent floating action when the tubing string is being run into the well bore. The apertures 12 and 13 are of such size as to prevent any object large enough to wedge between the packer, fishing tool, or other tool and the casing, from passing through the device.

As indicated earlier herein, my new safety device A may be used in connection with the running of packers, fishing tools, or any other tool having an outside diameter of sufficient size to become wedged in a cased bore hole.

In the use of my device, it is positioned on the tubing string at a point immediately above the packer, fishing tool, or other tool, and secured to the tubing string by means of the screws 9, the edge 4 of the bottom wall 2 and the inner edges 7 of the webs 6 functioning to maintain the cylindrical wall 1 properly spaced from the tubing string, whereby when the tubing string is in the well, any falling objects such as tong keys, bolts, sections of slip segments, hammer heads or other

objects which might fall within or be dropped into the well bore, will be directed into and retained in my safety device, thereby preventing plugging of the hole by the falling object becoming wedged between the packer, fishing tool, or other tool, and the casing. As has been previously explained, the inclined edges 10 and 11 of the cylinder 1 and webs 6, respectively, aid in directing the falling objects into my device, and the fluid passageways 12 and 13 prevent swabbing action and floating action when running the tubing string out of and into the well bore, respectively.

It will be obvious that my new safety device may be made in any desired size, and, preferably, it is manufactured from a drillable or millable material so that it may be removed from the well bore after drilling, by the usual washing action of the well fluid in the event the packer, fishing tool, or other tool becomes stuck by material from below, as is often the case.

While I have illustrated and described in detail herein the preferred embodiment of my invention for purposes of illustration, it is to be understood that the invention is not limited to the specific embodiment illustrated, since modifications thereof may occur to those skilled in the art, and it is my desire to cover all such modifications as come within the scope of the appended claims.

I claim:

1. In a safety device for catching objects in well bores; the combination comprising a substantially cylindrical side wall; an annular bottom wall having a circular inner edge, said bottom wall being connected to said side wall; a plurality of radially directed webs connected to said side and bottom walls; said webs each having an inner concave edge in alignment with the circular inner edge of said bottom wall; said side wall and said webs having aligned, upper, downwardly and inwardly inclined edges; apertures in said side and bottom walls; a threaded, radially directed opening in said annular bottom wall in alignment with each of said webs, and a set screw in each said opening.

2. In a safety device for catching objects in well bores; the combination comprising a substantially cylindrical side wall; an annular bottom wall having a circular inner edge, said bottom wall being connected to said side wall; a plurality of radially directed webs connected to said side and bottom walls; said webs each having an inner edge substantially in alignment with the inner edge of said bottom wall; said side wall and said webs having aligned, upper, downwardly and inwardly inclined edges; apertures in at least one of said walls; a threaded, radially directed opening in said annular bottom wall in alignment with each of said webs, and a set screw in each said opening.

3. In a safety device for catching objects in well bores; the combination comprising a substantially cylindrical side wall; an annular bottom wall having a circular inner edge, said bottom wall being connected to said side wall; a plurality of radially directed webs connected to

said side and bottom walls; said side wall and said webs having aligned, upper, downwardly and inwardly inclined edges; apertures in at least one of said walls; a threaded, radially directed opening in said annular bottom wall in alignment with each of said webs, and a set screw in each said opening.

4. In a safety device for catching objects in well bores; the combination comprising a substantially cylindrical side wall; an annular bottom wall having a circular inner edge, said bottom wall being connected to said side wall; a plurality of radially directed webs connected to said side and bottom walls, each of said webs having an upper, downwardly and inwardly inclined edge; apertures in at least one of said walls; a threaded, radially directed opening in said annular bottom wall, and a set screw in said opening.

5. In a safety device for catching objects in well bores; the combination comprising a substantially cylindrical side wall; an annular bottom wall having a circular inner edge, said bottom wall being connected to said side wall; a plurality of radially directed webs within said cylindrical side wall and connected to at least one of said walls, said webs each having an inner edge substantially in alignment with the inner edge of said bottom wall; apertures in at least one of said walls; a threaded, radially directed opening in said annular bottom wall, and a set screw in said opening.

6. In a device adapted to be secured to a tubular string for catching objects in a well bore; the combination comprising a substantially cylindrical side wall; an annular bottom wall having a circular inner edge, said bottom wall being connected to said side wall; a plurality of radially directed webs connected to said side and bottom walls; said side wall and said webs having aligned, upper, downwardly and inwardly inclined edges; and apertures in at least one of said walls.

7. In a device adapted to be secured to a tubular string for catching objects in a well bore; the combination comprising a substantially cylindrical side wall; an annular bottom wall having a circular inner edge, said bottom wall being connected to said side wall; a plurality of radially directed webs within said cylindrical side wall and connected to at least one of said walls, said webs each having an inner edge substantially in alignment with the inner edge of said bottom wall; and apertures in at least one of said walls.

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