

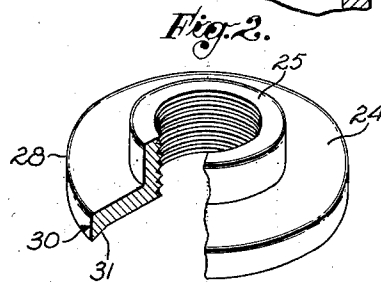
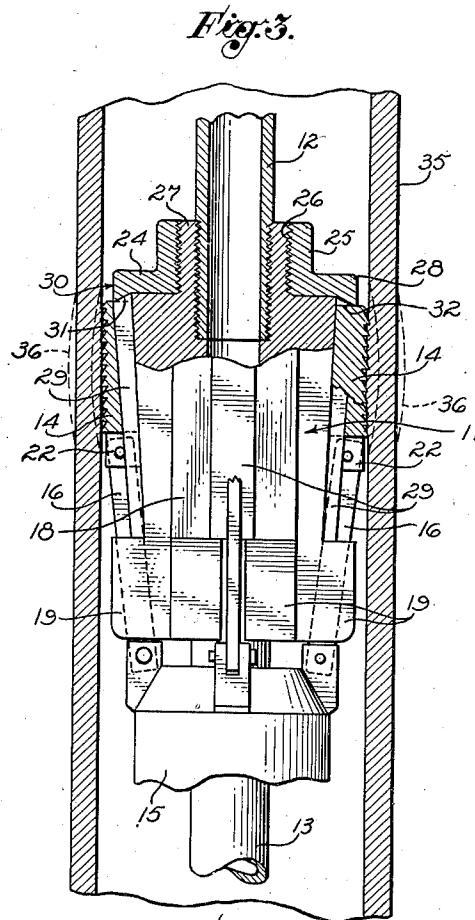
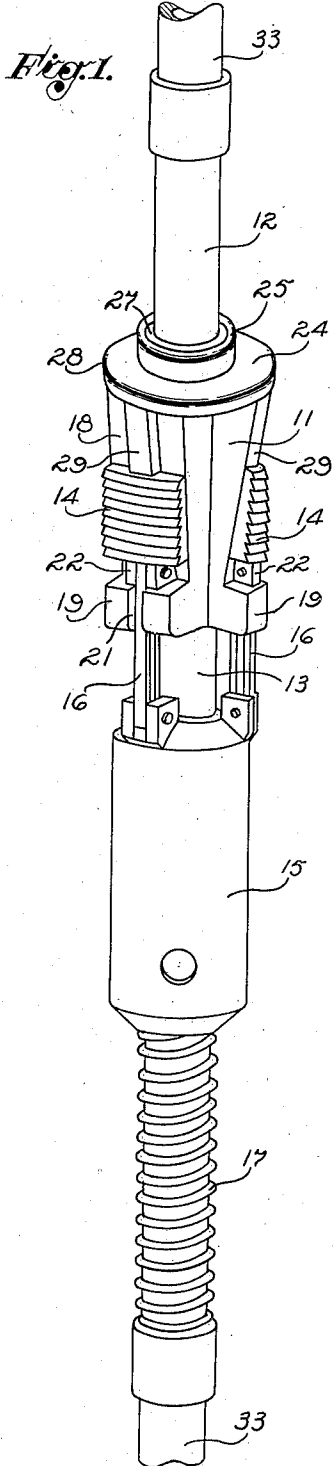
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TUBING CATCHER

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TUBING CATCHER

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7 Claims. (Cl. 103—219)

My invention relates to improvements in tubing catchers used in connection with tubing inserted in an oil well casing and constituting a safety device for catching the tubing should it start to fall in the well, and relates in particular to a means for assuring a better operation of these tubing catchers.

Tubing catchers of the general character referred to herein include a body having upwardly diverging slides on which jaws or slips are disposed normally in lowered or retracted position. Connected to these jaws is a mass member, generally comprising a body of metal, supported in such a manner that the inertia thereof will tend to hold the slips stationary during the time the tubing and the catcher body move downwardly at high velocity, as occurs when the upper end of the tubing is released or breaks and starts to fall within the well casing. Owing to the fact that the angle of divergence of the slides is relatively small, the component of outward pressure applied to the jaws due to the weight and downward movement of the tubing is relatively very large. As the result of this condition, it sometimes occurs, where the tubing is quite long and therefore heavy, that the outward force exerted by the slides against the jaws will expand the casing engaged by the jaws to such an extent that the jaws will slide off the upper ends of the slides, and the tubing will then drop to the bottom of the hole with disastrous results.

It is an object of my present invention to provide a means in a tubing catcher of this character, for limiting the upward movement of the jaws on the slides, thereby preventing the failure of the tubing catcher in the manner set forth in the preceding paragraph.

It is a further object of the invention to provide on the body of the tubing catcher means forming shoulders adapted to be engaged by the jaws when they have moved upwardly on the slides a desired distance, the shoulders thereby limiting the upward movement of the jaws so as to prevent them from coming off the slides, the result being that failure of the tubing catcher in the manner above described cannot occur.

It is a further object of the invention to provide a simple form of annular member which may be readily attached to existing tubing catcher bodies, to provide such bodies with shoulders for preventing the jaws of the tubing catcher from moving upwardly beyond the upper ends of the slides.

Further objects and advantages of the inven-

tion will be made evident throughout the following part of the specification.

Referring to the drawing, which is for illustrative purposes only,

Fig. 1 is a perspective view of a tubing catcher embodying my invention.

Fig. 2 is a partly sectioned perspective view of the shoulder forming member employed in Fig. 1.

Fig. 3 is a partly sectioned view, fragmentary in character, showing the tubing catcher with the slips or jaws thereof engaging the well casing.

The improved tubing catcher forming the preferred embodiment of my invention comprises a body 11, tubes 12 and 13 extending respectively upwardly and downwardly, jaws or slips 14 slidably mounted on the body 11, a mass member 15 slidable upon the lower tube 13 and being connected by links 16 with the jaws 14, and a spring 17 on the lower part of the tube 13 for exerting an upward pressure against the member 15.

The jaws 14 are carried on slides or guides 18 which slope upwardly and outwardly from shoulders 19 which are provided with slots 21 through which the links 16 may pass. The upper ends of the links 16 are connected to projections 22 on the lower ends of the jaws 14, these projections 22 engaging the shoulders 19, limiting the downward movement of the projections 22 so that the mass member in effect hangs from the members 22 through the connection of the links 16 therewith. A part of the weight of the mass member 15, however, is supported by the spring 17.

On the upper end of the body 11 is an annular member 24 made substantially as shown in Fig. 2, and applied to the body 11 as shown in Fig. 3. The annular member 24 has a means for securing it to the body 11, such means being preferably in the form of a threaded boss 25 which screws upon threads 26 formed on a hub 27 which projects upwardly from the body 11. The periphery 28 of the annular member 24 is of such diameter that it will project slightly beyond the upper ends of dovetail ribs 29 forming parts of the guides 18 for the jaws 14. As shown at 30 in Fig. 2, and also as shown in Fig. 3, the under part of the peripheral portion 28 is sloped downwardly to provide downwardly and outwardly sloping shoulders 31 adapted to be engaged by the upper end faces 32 of the jaws 14 when the upper ends of the guides 18 are reached by such jaws 14.

The tubing catcher is connected in a string of

tubing 33, and the members 12, 11, and 13 thereof, being hollow, then form a part of the tubing which may be lowered into the well casing in the customary manner. The jaws 14 normally rest in the position in which they are shown in Fig. 1. Should the tubing become released or detached at any point above the tubing catcher, with the result that the tubing in the well starts to drop, the guides 18 move downwardly relative to the jaws 14 which are connected through the links 16 with the mass member 15 which momentarily tends to remain stationary due to the inertia thereof and due to the upward pressure of the spring 17. Accordingly, the jaws 14 are moved relatively upwardly and outwardly along the guides 18, and by the guides 18 are forced outwardly into engagement with the well casing 35, as shown in Fig. 3. The expansive force applied through the jaws 14 to the casing 35 varies in accordance with the downward force exerted against the body 11. This downward force has at times been so great as to break the links 16 and to force the guides 18 down through the jaws 14, causing the casing 35 to expand into a position such as indicated by dotted lines 36 of Fig. 3 and resulting in the jaws 14 sliding relatively upwardly off the upper ends of the guides 18. My invention prevents this for the reason that when the jaws 14 reach the shoulders 31, the downward force against the jaws is transmitted principally through the shoulders 31, at which time there is no stress on the links 16 other than the weight of the mass member 15. When the jaws 14 are in fully expanded position they will expand the casing 35 to a limited extent, and in bringing the tubing to a stop within the casing the jaws slide downwardly along the inner surface of the casing 35 to a distance depending upon the amount of energy which must be absorbed in stopping the tubing.

The annular member 24 is of such character that it may be quickly secured to existing tubing catchers. Such tubing catchers ordinarily have a hub 27 at the upper end of a body 11. This hub may be threaded to receive the internally threaded boss 25 of the member 24, and the member 24 may be then screwed on the upper end of the body 11.

Although I have herein shown and described my invention in simple and practical form, it is recognized that certain parts or elements thereof are representative of other parts, elements, or mechanisms which may be used in substantially the same manner to accomplish substantially the same results; therefore, it is to be understood that the invention is not to be limited to the details disclosed herein but is to be accorded the full scope of the following claims.

I claim as my invention:

1. In a tubing catcher of the character described for connection to a string of tubing insertable in a well casing, the combination of: a body having means for connecting it into a string of tubing, said body having upwardly diverging dovetailed guides; jaws slidable on said guides in dovetailed engagement therewith from lowered position to raised position; shoulder means removably mounted on said body forming stops engageable by said jaws so that the upward movement of said jaws on said guides will be thereby limited; a mass member mounted on said body so as to have vertical movement; and means connecting said mass member to said jaws.

2. In a tubing catcher of the character described for connection to a string of tubing in-

sertable in a well casing, the combination of: a body having means for connecting it into a string of tubing, said body having upwardly diverging dovetailed guides; jaws slidable on said guides in dovetailed engagement therewith from lowered position to raised position; a ring member removably threaded on said body having a peripheral portion forming stops engageable by said jaws so that the upward movement of said jaws on said guides will be thereby limited; a mass member mounted on said body so as to have vertical movement; and means connecting said mass member to said jaws.

3. In a tubing catcher of the character described for connection to a string of tubing insertable in a well casing, the combination of: a body having means for connecting it into a string of tubing, said body having upwardly diverging guides; jaws slidable on said guides from lowered position to raised position; a ring member detachably secured on the upper part of said body having a peripheral portion forming stops engageable by said jaws so that the upward movement of said jaws on said guides will be thereby limited; a mass member mounted on said body so as to have vertical movement; and means connecting said mass member to said jaws.

4. In a tubing catcher of the character described for connection to a string of tubing insertable in a well casing, the combination of: a body having means for connecting it into a string of tubing, said body having upwardly diverging guides; jaws slidable on said guides from lowered position to raised position, the upper ends of said guides being of such character that the jaws may be installed on said guides from the upper ends thereof; removable means adapted for attachment to said body, said removable means having shoulders forming stops engageable by said jaws so that the upward movement of said jaws on said guides will be thereby limited; a mass member mounted on said body so as to have vertical movement; and means connecting said mass member to said jaws.

5. In a tubing catcher of the character described for connection to a string of tubing insertable in a well casing, the combination of: a body having means for connecting it into a string of tubing, said body having upwardly diverging guides; jaws slidable on said guides from lowered position to raised position, the upper end of said guides being of such character that the jaws may be installed on said guides from the upper ends thereof; an annular member adapted to be on the upper end of said body, said annular member having its peripheral portion disposed so as to form stops for limiting the upward movement of said jaws on said guides; a mass member mounted on said body so as to have vertical movement; and means connecting said mass member to said jaws.

6. In a tubing catcher for connection in a string of tubing insertable within a well casing and having a body with upwardly diverging slides, jaws on said slides, and a mass member connected to said jaws, a safety attachment for limiting the upward movement of said jaws on said slides, comprising: an annular member provided with means for connecting it to the upper end of said body of said tubing catcher, the peripheral portion of said annular member forming shoulders disposed so as to be engaged by said jaws and to thereby limit the upward movement of said jaws on said slides.

7. In a tubing catcher for connection in a string

of tubing insertable within a well casing and having a body with upwardly diverging slides, jaws on said slides, and a mass member connected to said jaws, a safety attachment for limiting the upward movement of said jaws on said slides, comprising: an annular member threaded for engagement with the upper end of said body of

said tubing catcher, the peripheral portion of said annular member forming outwardly and downwardly sloping shoulders disposed so as to be engaged by said jaws and to thereby limit the upward movement of said jaws on said slides. 5

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