

W. H. McKISSICK.
TUBING CATCHER OR HOLDER.
APPLICATION FILED JULY 2, 1919.

1,374,307.

Patented Apr. 12, 1921.

Fig. 1.

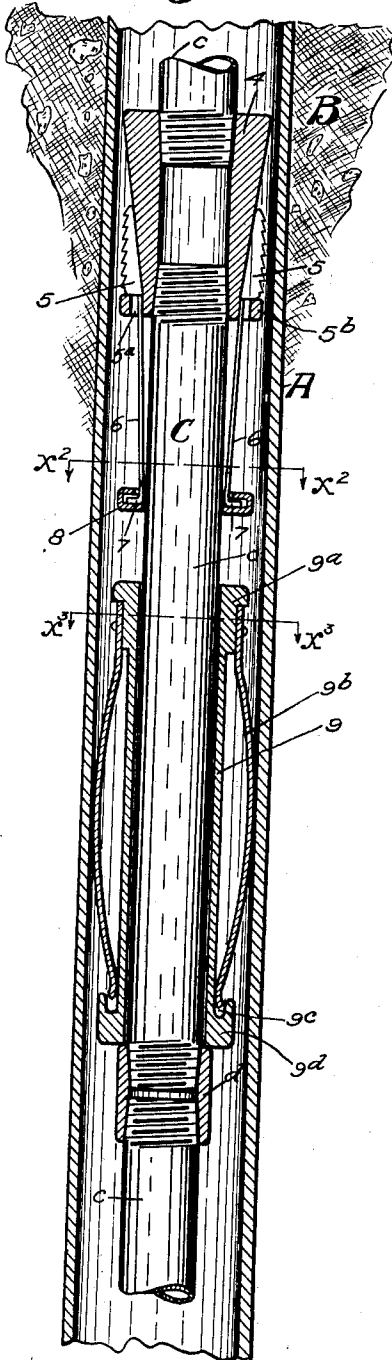


Fig. 2.

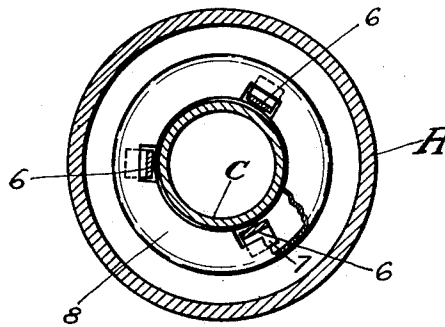
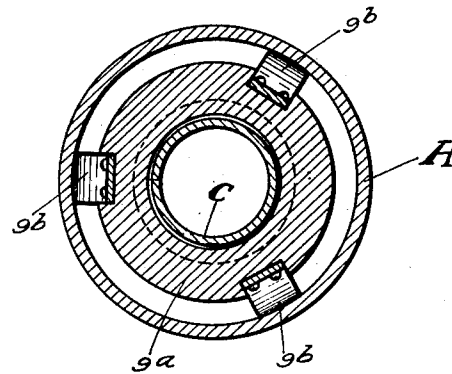


Fig. 3.



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TUBING CATCHER OR HOLDER.

1,374,307.

Specification of Letters Patent. Patented Apr. 12, 1921.

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To all whom it may concern:

Be it known that I, WILLIAM H. McKISSICK, a citizen of the United States, residing at Tulsa, in the county of Tulsa and State of Oklahoma, have invented new and useful Improvements in Tubing Catchers or Holders, of which the following is a specification.

This invention relates to devices for catching and holding oil well tubing, and it has for its object to provide improvements of this kind of oil well apparatus, which will be superior in point of relative simplicity and inexpensiveness in construction, taken in conjunction with reliability and positiveness in action, durability and dependability, compactness in form, and convenience in use and in installing and removing the tubing from the well, and which will be likewise superior in efficiency and serviceability.

Devices or apparatus of the nature stated are indispensable in the maintenance of proper conditions incident to the pumping of oil and other wells, in which a long "string" of tubing is maintained within the well, and within the well casing, and through which tubing the pumping takes place. This string of tubing is associated with the pump barrel with its valves, and the pump rods are extended down through the tubing and the oil or other liquid is raised through the tubing and discharged at the mouth of the well. These strings of tubing are often of great length, frequently two or three or more thousands of feet long, and in handling and disposing the same in the well are subjected to the risk of parting between their ends, which results in the nether or severed portion of the string falling in the well. When this portion of the string beneath the break so falls, the pump barrel, tubing, well and well casing are frequently severely damaged, buckled, strained, broken and otherwise injured, and the attendant losses in time and money value are often very great. These breaks in the string of tubing are most likely to occur at the "collars" or unions or threaded joints between the several lengths of tubing. If the threads are broken or stripped at one of these joints it results in a parting of the string, and unless some means are provided for instantaneously checking the fall of the tubing, the above-mentioned damaging and injurious results occur. Many expedients and means have been devised, with more or less

success, to perform this automatic and instantaneous catching and holding function, and thus to check the descent of the severed tubing immediately upon the occurrence of the severance. The present invention has for its objects those above mentioned and others which, in the use of the invention, will be found to obtain. In carrying out the invention, I provide suitable slips or devices which operate to expand over a suitable wedge-shaped body or mandrel and which are normally in positions of contraction, and means, involving the inter-relation and co-action of factors of friction and gravity, to cause the expansion of these slips immediately upon the parting of the tubing above the slips. These means are not effective when the tubing is being normally lowered into and elevated from the well, but it becomes effective when an emergency takes place, namely, when the tubing parts above the slips.

The invention consists in the novel and useful provision, formation, construction, combination, association and relative association and relative arrangement of parts, members and features, all as hereinafter described, shown in the drawings, and finally pointed out in claims.

In the drawing:

Figure 1 is a fragmentary vertical sectional view, partly in elevation, of a length of well casing, and of part of a string of well tubing therein, the features of the invention being likewise illustrated in conjunction therewith, and the parts being in normal positions prior to a break in the tubing;

Fig. 2 is an enlarged detail transverse sectional view, taken upon the line x^2-x^2 , Fig. 1, and looking in the direction of the appended arrows; and

Fig. 3 is an enlarged detail transverse sectional view, taken upon the line x^3-x^3 , Fig. 1, and looking in the direction of the appended arrows.

Corresponding parts in all the figures are designated by the same reference characters.

Referring with particularity to the drawing, A designates a portion of a string of well casing, which is to be understood as lowered within the well-hole produced through the earth formation B, C designating a string of well tubing suspended with-

in the casing A, and consisting of lengths or sections *c*, which lengths or sections are assembled together in a string by joints or collars or unions *d*. In practising the invention, I provide a suitable downwardly tapering tubular wedge body 4, at opposite sides of which are disposed serrated slips 5, adapted to play vertically upon the wedge body 4, and provided each with a downwardly directed leg or stem 6, which is hooked at its lower end, as at 7, into a chambered ring 8, which slidably surrounds the tubing C, between the mandrel or wedge body 4 and the next lower joint *d*. This tubular mandrel 4 is threaded to the opposed ends of two lengths *c* of tubing, serving as a joint or union for such lengths. Slidably mounted to surround the tubing length *c* which is surrounded by the ring 8 is an elongated sleeve 9, provided at its upper end with a head or enlargement 9^a, to which are attached opposed bowed or arcuate leaf springs 9^b, frictionally engaging the inner surface of the casing A, such leaf springs extending downwardly within an annular chamber 9^c in a similar terminal head or enlargement 9^d, upon the lower end of the sleeve 9 and adapted to come into contact with the next lower collar or joint *d*, and to be stopped thereby. The head 9^a is adapted to be engaged with the ring 8, in the operation of the invention.

A slight clearance is provided, as at 5^a, in openings in an annular rim 5^b formed at the lower end of the mandrel or wedge body 4, and through these openings range the legs or stems 6 of the slips 5.

The coefficient of friction of the springs 9^b upon the inner wall of the casing A, is less than sufficient to normally overcome the weight of the slip 9 and its connected parts. Let us assume that this coefficient of friction is sufficient to support a fifteen-pound weight or load, and that the sleeve and disconnected parts have a total weight of thirty pounds. Obviously the head 9^a will normally rest upon the collar *d*, both in lowering the tubing and attendant features through the casing, and when such tubing and features are in position of service within the casing. If, however, a break in the tubing occurs above the mandrel 4, and the tubing and attendant features beneath such break comes to fall within the casing, the friction of the springs 9^b upon the inner wall of the casing will temporarily arrest the descent of the sleeve 9 and its connected parts, the tubing section *c* which the sleeve surrounds thereupon falling through the sleeve, and bringing the ring 8 into contact with the head 9^a, which forces the slips 5 and their stems 6 upwardly, causing the slips to be expanded upon the mandrel body 4, and to be engaged with and grip the casing A, in wedge

action, between the casing and the mandrel, thus effectively arresting the descent of the tubing through the casing and holding it and preventing its further fall. This arresting and catching action will occur after the tubing has fallen but a few inches. The sleeve 9 and its attendant parts then of course eventually fall to the stopped position shown in the drawing, whereupon the tubing may be fished for and raised in the well and recovered, the slips 5 being rendered inoperative and ineffective as soon as this elevation of the tubing commences. The break may be repaired and the tubing again lowered, whereupon the feature of the invention will stand ready to perform automatically in case of further breakage, in the manner above pointed out.

The entire invention is relatively simple and extremely effective in operation, and its construction and organization may be widely varied, without departing from the true spirit of the invention.

Having thus disclosed my invention, I claim and desire to secure by Letters Patent:

1. The combination, with well casing, and a string of tubing in the well casing; of a wedge body mounted in connection with the tubing, a slip mounted in connection with the wedge body and adapted to be expanded thereby into position to engage with the casing and suspend the tubing, a weight slidable upon the tubing beneath and independent of the slip, the weight being frictionally engaged with the casing; whereupon the slip will be held to wedge action by the temporarily arrested weight upon abrupt fall of the tubing.

2. The combination, with well casing, and a string of tubing in the well casing; of a wedge body mounted in connection with the tubing, a slip mounted in connection with the wedge body and adapted to be expanded thereby into position to engage with the casing and suspend the tubing, a weight slidable upon the tubing beneath the slip, and a spring connected with the weight and frictionally engaged with the casing; whereupon the slip will be held to wedge action by the temporarily arrested weight upon abrupt fall of the tubing; the pressure of the spring against the casing being less than sufficient to normally support the weight.

3. The combination, with well casing, and a string of tubing in the well casing; of a wedge body mounted in connection with the tubing, a slip mounted in connection with the wedge body and adapted to be expanded thereby into position to engage with the casing and suspend the tubing, a weight slidable upon the tubing beneath the slip, and a spring connected with the weight and frictionally engaged with the casing; whereupon the slip will be held to wedge action by the temporarily arrested weight upon

abrupt fall of the tubing; said wedge body being provided with an enlargement having an opening, and the slip being provided with a stem extending through the opening into position to be arrested by the weight; the weight being capable normally of overcoming the frictional resistance of the spring.

4. The combination, with well casing, and a string of tubing in the well casing; of a wedge body mounted in connection with the tubing, a slip mounted in connection with the wedge body and adapted to be expanded thereby into position to engage with the casing and suspend the tubing, a weight slidable upon the tubing beneath the slip, and a spring connected with the weight and frictionally engaged with the casing; whereupon the slip will be held to wedge action by the temporarily arrested weight upon abrupt fall of the tubing; said wedge body being provided with an enlargement having an eye, and the slip being provided with a stem extending through the eye into position to be arrested by the weight; a ring being slidably disposed upon the tubing above the weight, and the said stem being hooked loosely to the ring, whereby the ring is directly engaged in the arresting of the stem to hold the slip to wedge action.

5. The combination, with well casing, and a string of tubing in the well casing; of a wedge body mounted in connection with the tubing, a slip mounted in connection with the wedge body and adapted to be expanded thereby into position to engage with the casing and suspend the tubing, a weight slidable upon the tubing beneath the slip, and a spring connected with the weight and frictionally engaged with the casing; whereupon the slip will be held to wedge action by the temporarily arrested weight upon abrupt fall of the tubing; stop means being provided upon the tubing beneath the weight; said weight being normally capable of overcoming the frictional action of the spring.

6. The combination, with well casing, and a string of tubing in the well casing; of a wedge body mounted in connection with the tubing, a slip mounted in connection with the wedge body and adapted to be expanded thereby into position to engage with the casing and suspend the tubing, a weight slidable upon the tubing beneath the slip, and a spring connected with the weight and frictionally engaged with the casing; whereupon the slip will be held to wedge action by the temporarily arrested weight upon abrupt fall of the tubing; stop means being provided upon the tubing beneath the weight; said weight comprising a slip slidably surrounding the tubing; said weight being normally capable of overcoming the frictional action of the spring.

7. The combination, with well casing, and

a string of tubing in the well casing; of a wedge body mounted in connection with the tubing; a slip mounted in connection with the wedge body and adapted to be expanded thereby into position to engage with the casing and suspend the tubing, a weight slidable upon the tubing beneath the slip, and a spring connected with the weight and frictionally engaged with the casing; whereupon the slip will be held to wedge action by the temporarily arrested weight upon abrupt fall of the tubing; said wedge body being provided with an enlargement having an eye, and the slip being provided with a stem extending through the eye into position to be arrested by the weight; said stem having clearance in said eye.

8. The combination, with a well casing, and a string of tubing in the casing, of a wedge body mounted in connection with the tubing, slips mounted in connection with the wedge body so as to be expanded into engagement with the casing upon descent of the wedge body and tubing, and a weight surrounding the tubing beneath the slips, and provided with a spring bearing against the inner surface of the casing, to hold the slips in position and cause the wedge action thereof upon the abrupt descent of the tubing; said weight being normally capable of overcoming the frictional action of the spring.

9. The combination, with a well casing, and a string of tubing in the casing, of a wedge body mounted in connection with the tubing, slips mounted in connection with the wedge body so as to be expanded into engagement with the casing upon descent of the wedge body and tubing, and a weight surrounding the tubing beneath the slips, and provided with a spring bearing against the inner surface of the casing, to hold the slips in position and cause the wedge action thereof upon the abrupt descent of the tubing; stop means being provided upon the tubing beneath the weight; said weight being normally capable of overcoming the frictional action of the spring.

10. The combination, with a well casing, and a string of tubing in the well casing; of a wedge body mounted in connection with the tubing, a slip mounted in connection with the wedge body and adapted to be expanded thereby into position to engage with the casing and support the tubing, a weight slidable upon the tubing beneath the slip, there being a frictional relation between the weight and the casing, the coefficient of which is normally insufficient to support the weight; said weight being disposed in position to constrain the slip from downward movement upon an abrupt fall of the tubing and wedge thereon, and to thus act resultant upon frictional co-action of the weight and the casing to temporarily arrest the weight.

11. The combination, with a well casing,
and a string of tubing for the well casing;
of a wedge body mounted in connection with
the tubing, a slip mounted in connection
5 with the wedge body and adapted to be ex-
panded thereby into position to engage with
the casing and support the tubing, and a
weight slidable upon the tubing beneath the
slip and independent thereof, there being a
10 frictional relation between the weight and
the casing, the coefficient of which is nor-
mally insufficient to support the weight;
said weight being disposed in position to
constrain the slip from downward move-

ment upon an abrupt fall of the tubing and 1
wedge upon the tubing, and thus to act re-
sultant upon frictional co-action of the
weight and casing to temporarily arrest the
fall of the tubing and parts connected there-
with. 2

In testimony whereof, I have signed my
name to this specification in the presence of
two subscribing witnesses.

WILLIAM H. McKISSICK.

Witnesses:

J. D. McINTYRE,
Roy Dow.