S. A. GUIBERSON, JR.

WELL TUBING CATCHER.

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1,218,549.

Patented Mar. 6, 1917.

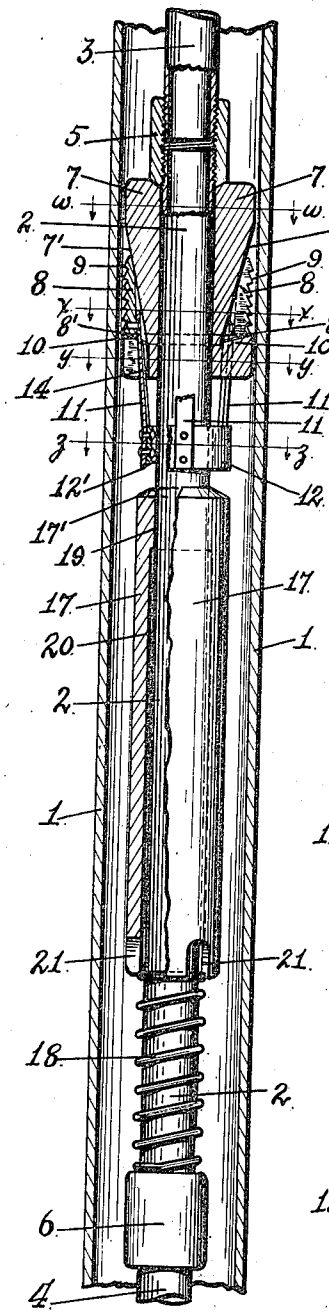


Fig. 1.

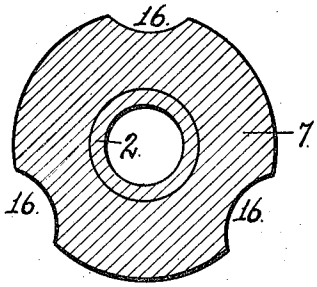


Fig. 3.

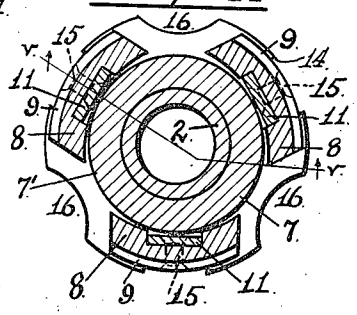


Fig. 4.

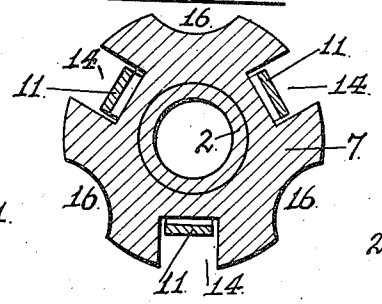


Fig. 5.

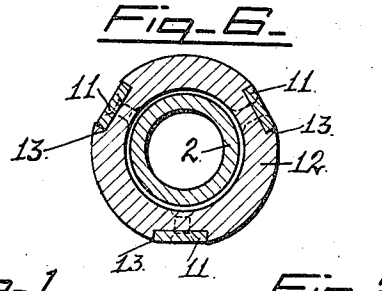


Fig. 6.

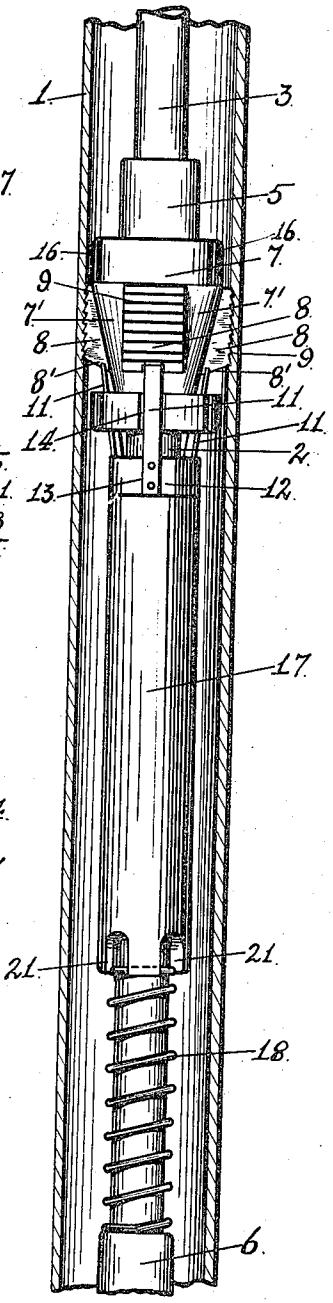


Fig. 2.

WITNESS

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WELL-TUBING CATCHER.

1,218,549. Specification of Letters Patent. Patented Mar. 6, 1917.

Application filed March 1, 1916. Serial No. 81,386.

To all whom it may concern:

Be it known that I, SAMUEL ALLEN GUIBERSON, Jr., a citizen of the United States, residing in the city and county of San Francisco and State of California, have invented certain new and useful Improvements in Well-Tubing Catchers, of which the following is a specification.

My invention relates to the class of well-tubing catchers, and particularly to that type in which the gripping device, while the tubing is intact, is normally inoperative, but which, due to the inertia of an associated weight, and the expansion of a spring upon which said weight is supported, is thrown into functional action when the tubing breaks.

The object of my invention is to provide a well-tubing catcher of this type, in which improved details result in good constructive practice and in advantageous operation.

To this end my invention consists in the novel well-tubing catcher which I shall hereinafter fully describe by reference to the accompanying drawings, in which—

Figure 1 is a vertical section of a well-casing showing my improved tubing-catcher, partly in section and partly in broken elevation, the position of its several members being the normal one when out of action. The section of the head 7 in this figure is on the line *v—v* of Fig. 4.

Fig. 2 is a vertical section of the well-casing, showing the tubing-catcher in elevation, the position of its members being that of functional activity in catching and suspending the tubing.

Fig. 3 is a cross section on the line *w—w* of Fig. 1.

Fig. 4 is a cross section on the line *x—x* of Fig. 1.

Fig. 5 is a cross section on the line *y—y* of Fig. 1.

Fig. 6 is a cross section on the line *z—z* of Fig. 1.

All the cross-sections are enlarged with respect to Fig. 1.

1 is the well-casing. 2 is that section of the well-tubing with which the catcher is directly associated. 3 is an upper section of the tubing and 4 is a lower section, these three sections sufficiently indicating the line of tubing, which line, in practice, is of great length and weight. The sections 2 and 3 are united by the ordinary tubing collar 5, screwed upon them; and sections 2 and 4 are united by a similar collar 6.

7 is a gripper-slip carrying-head. Heretofore the slip-carrying head has been incorporated in or connected with the line of tubing by screwing it therein or thereon, threads being made for this purpose on the tubing and within each end of the head. This connection has been found in manufacture to be expensive construction, and in practice to be faulty in point of strength. In my improved construction I cast the head 7 directly upon and about the upper end of the tube section 2, and directly against the rounded or beveled lower end of the collar 5, as shown in Fig. 1, the latter thus serving as a solid abutment to insure the practically integral union of the head with the tubing, and to assist in resisting the enormous longitudinal weight strain upon said head when its gripper slips are thrown into action.

8 are the gripper slips. There may be any number of these slips, three being usual. They are formed on their outer faces with the usual teeth 9. It has been customary heretofore to carry these slips, by a dove-tail slide, upon flat surfaces or planes inclined in such manner that when the slips are down in normal position their toothed faces are removed from contact with the casing wall and when they are up they contact with and grip said wall and thereby support the tubing in case of a break. This mounting of the slips requires expensive machining.

In my improvement, I simply turn the head circumferentially to a symmetrical downward taper as shown at 7′, and I make the inner faces of the slips transversely curvilinear on a radius adapting them for a close fit on the taper of the head in that zone of said taper which will cause their outward expansion or movement into contact with the casing wall, which is their functionally operative position at which they will receive and bear the greatest strain in case of a break in the tubing, as is clearly shown in Fig. 2. In lower positions, wherein the slips are functionally inoperative, they do not fit the taper of the head closely, as seen in Fig. 4, and they are, therefore, very free and can be moved upward with the greatest ease, thereby increasing their sensitiveness for functional operation.

This construction, however, renders it

necessary to provide some means for holding the slips in to the taper of the head, in their lower position, so that they will, when inactive, have no tendency to project outwardly and be in danger of contacting with the casing wall. Accordingly, I turn the shoulder at the base of the head taper 7′, on an inward and downward bevel as shown at 10, and correspondingly bevel inwardly the base of the slips as shown at 8′. When, therefore, the slips rest upon this inwardly inclined shoulder 10, as in Fig. 1, they tend, by their own weight, to slip inwardly and hug sufficiently closely the base of the taper 7′. Furthermore, in order to hold them in close to the taper, without interfering with their outward movement as they relatively rise to functional position, the links 11 which connect them with the freely slidable ring 12 below are made of a springy nature. The spring of the links 11, holds the slips in, but said links yield outwardly as the slips rise. The lower ends of the spring links are riveted in suitable seats at 13 in the ring 12, and they thence pass up freely and with sufficient play in grooves 14 in the base of the head 7, and are riveted at 15, Fig. 4 in the inner faces of the bases of the slips. The slip controlling ring 12 which operates all the slips in unison, is freely fitted about the tubing 2, as shown in Fig. 6. 16 are the usual water courses in the head 7.

17 is a weight. This is a tube which freely envelops the tubing 2 and is movable independently thereof. It is supported by a spring 18 which is seated at its upper end in the base of the weight, and said spring is itself supported at its lower end on the tubing collar 6. The weight 17 compresses the spring 18 sufficiently to cause the upper end of said weight to be normally separated by a slight space from the controlling ring 12 when the tubing is intact and normal conditions prevail, as shown in Fig. 1. This separation avoids the transmission of slight vibrations of the spring-supported weight to the controlling ring when the catcher is inactive, all the parts then being in the relative positions shown in Fig. 1.

If the tubing should break, the effect may be thus described. The inertia of the weight 17, accentuated by the tendency of the spring 18 to expand, will cause the contact of the upper end of the weight with the controlling ring 12, and this contact will result, through the links 11, in momentarily arresting and supporting the gripper slips 8, so that as the tapered head 7 moves down, the slips will be forced out to engage their toothed faces with the casing 1, all as shown in Fig. 2. This engagement of the slips with the casing will thus cause the tubing to be caught and held against a further drop.

The upper end of the weight is beveled as shown at 17′ in Fig. 1, and the lower face of the controlling ring is correspondingly recessed as shown at 12′, which provides for an even and uniform contact pressure, and avoids any tendency for sand to lodge thereon. The upper end of the weight fits the tubing somewhat closely for a short distance, as shown at 19, thereby tending to exclude sand. From this relatively close fitting portion down to the lower end, the weight has a larger bore, thereby leaving a larger space, as seen at 20 in Fig. 1, for the free passage of any sand which may enter said weight; and the weight has openings 21 at its lower end to permit the free discharge of sand and to prevent said sand from packing against the spring. The weight is thus kept clear for its free action; and the spring 18 by being wholly below the weight, and not within it, not only keeps the weight clear, but guards against its own clogging by sand.

I claim:—

1. A well-tubing catcher comprising a head secured upon the tubing, said head being circumferentially turned on a downward and inward taper; gripper slips having inner faces curved to a close fit on the functionally operative zone of the taper of the head; spring links connected with the base of said slips to yieldingly hold them to the head taper; a controlling ring fitted freely about the tubing and to which the lower ends of the spring links are connected; and a weight associated with and movable independently of the tubing, and adapted by its inertia when the tubing drops, to contact with the controlling ring and throw the slips into gripping contact with the well-casing.

2. A well-tubing catcher comprising a head secured upon the tubing, said head being circumferentially turned on a downward and inward taper; gripper slips having inner faces curved to a close fit on the functionally operative zone of the taper of the head; spring links connected with the base of said slips to yieldingly hold them to the head taper; a controlling ring fitted freely about the tubing and to which the lower ends of the spring links are connected; a weight associated with and movable independently of the tubing; and a spring supporting said weight and adapted by its expansion and the inertia of the weight, when the tubing drops, to cause said weight to contact with the controlling ring and throw the slips into gripping contact with the well-casing.

3. A well-tubing catcher comprising a head secured upon the tubing, said head being circumferentially turned on a downward and inward taper, to a shoulder the surface of which is inwardly and down-

wardly inclined; gripper slips having inner faces curved to a close fit on the functionally operative zone of the taper of the head, said slips having their bases beveled to correspond with the incline of the shoulder at the base of the head taper; spring links connected with the base of said slips to yieldingly hold them to the head taper; a controlling ring fitted freely about the tubing and to which the lower ends of the spring links are connected; and a weight associated with and movable independently of the tubing, and adapted by its inertia when the tubing drops, to contact with the controlling ring and throw the slips into gripping contact with the well-casing.

4. A well-tubing catcher comprising a head secured upon the tubing, said head being circumferentially turned on a downward and inward taper, to a shoulder the surface of which is inwardly and downwardly inclined; gripper slips having inner faces curved to a close fit on the functionally operative zone of the taper of the head, said slips having their bases beveled to correspond with the incline of the shoulder at the base of the head taper; spring links connected with the base of said slips to yieldingly hold them to the head taper; a controlling ring fitted freely about the tubing and to which the lower ends of the spring links are connected; a weight associated with and movable independently of the tubing; and a spring supporting said weight and adapted by its expansion and the inertia of the weight, when the tubing drops, to cause said weight to contact with the controlling ring and throw the slips into gripping contact with the well-casing.

5. A well-tubing catcher comprising tube sections and a collar uniting them; a head cast upon the upper end of one of said tube sections and against the base of the uniting collar; gripper slips carried by the head and normally out of contact with the well-casing; links connected with said slips; a controlling ring common to all said links, to operate the slips in unison; and a weight associated with and movable independently of the tubing, and adapted by its inertia when the tubing drops, to contact with the controlling ring and throw the slips into gripping contact with the well-casing.

6. A well-tubing catcher comprising tube sections and a collar uniting them; a head cast upon the upper end of one of said tube sections and against the base of the uniting collar; gripper slips carried by the head and normally out of contact with the well-casing; links connected with said slips; a controlling ring common to all said links, to operate the slips in unison; a weight associated with and movable independently of the tubing; and a spring supporting said weight and adapted by its expansion and the inertia of the weight, when the tubing drops, to cause said weight to contact with the controlling ring and throw the slips into gripping contact with the well-casing.

7. A well-tubing catcher comprising tube sections and a collar uniting them; a head cast upon the upper end of one of said tube sections and against the base of the uniting collar, said head being circumferentially turned on a downward and inward taper; gripper slips having inner faces curved to a close fit on the functionally operative zone of the taper of the head; spring links connected with the base of said slips to yieldingly hold them to the head taper; a controlling ring fitted freely about the tubing and to which the lower ends of the spring links are connected; and a weight associated with and movable independently of the tubing, and adapted by its inertia when the tubing drops, to contact with the controlling ring and throw the slips into gripping contact with the well-casing.

8. A well-tubing catcher comprising tube sections and a collar uniting them; a head cast upon the upper end of one of said tube sections and against the base of the uniting collar, said head being circumferentially turned on a downward and inward taper; gripper slips having inner faces curved to a close fit on the functionally operative zone of the taper of the head; spring links connected with the base of said slips to yieldingly hold them to the head taper; a controlling ring fitted freely about the tubing and to which the lower ends of the spring links are connected; a weight associated with and movable independently of the tubing; and a spring supporting said weight and adapted by its expansion and the inertia of the weight, when the tubing drops, to cause said weight to contact with the controlling ring and throw the slips into gripping contact with the well-casing.

9. A well-tubing catcher comprising tube sections and a collar uniting them; a head cast upon the upper end of one of said tube sections and against the base of the uniting collar, said head being circumferentially turned on a downward and inward taper, to a shoulder the surface of which is inwardly and downwardly inclined; gripper slips having inner faces curved to a close fit on the functionally operative zone of the taper of the head, said slips having their bases beveled to correspond with the incline of the shoulder at the base of the head taper; spring links connected with the base of said slips to yieldingly hold them to the head taper; a controlling ring fitted freely about the tubing and to which the lower ends of the spring links are connected; and a weight associated with and movable independently of the tubing, and adapted by its inertia when the tubing drops, to contact with the

controlling ring and throw the slips into gripping contact with the well-casing.

10. A well - tubing catcher comprising tube sections and a collar uniting them; a head cast upon the upper end of one of said tube sections and against the base of the uniting collar, said head being circumferentially turned on a downward and inward taper; gripper slips having inner faces curved to a close fit on the functionally operative zone of the taper of the head; spring links connected with the base of said slips to yieldingly hold them to the head taper; a controlling ring fitted freely about the tubing and to which the lower ends of the spring links are connected; a weight associated with and movable independently of the tubing; and a spring supporting said weight and adapted by its expansion and the inertia of the weight, when the tubing drops, to cause said weight to contact with the controlling ring and throw the slips into gripping contact with the well-casing.

11. A well - tubing catcher comprising gripping members carried by the tubing and normally out of contact with the well-casing; links connected with said gripping members; a controlling ring common to all said links, said ring having a recessed lower face; a tubular weight surrounding the tubing below the controlling ring, said weight having a beveled upper end for contact with the recessed lower face of the controlling ring, and said weight fitting the tubing relatively closely at the upper end and thence down to the lower end fitting said tubing more freely; and a spring around and supported by the tubing below the weight, said spring at its upper end being seated in the base of the weight and supporting said weight, and adapted by its expansion and the inertia of the weight, when the tubing drops, to cause said weight to contact with the controlling ring and throw the gripping members into gripping contact with the well-casing.

12. A well - tubing catcher comprising gripping members carried by the tubing and normally out of contact with the well-casing; links connected with said gripping members; a controlling ring common to all said links, said ring having a recessed lower face; a tubular weight surrounding the tubing below the controlling ring, said weight having a beveled upper end for contact with the recessed lower face of the controlling ring, and said weight fitting the tubing relatively closely at the upper end and thence down to the lower end, fitting said tubing more freely; and having sand escape holes in said lower end; and a spring around and supported by the tubing below the weight, said spring at its upper end being seated in the base of the weight and supporting said weight, and adapted by its expansion and the inertia of the weight, when the tubing drops, to cause said weight to contact with the controlling ring and throw the gripping members into gripping contact with the well-casing.

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

SAMUEL ALLEN GUIBERSON, JR.

Witnesses:
WM. F. BOOTH,
D. B. RICHARDS.