

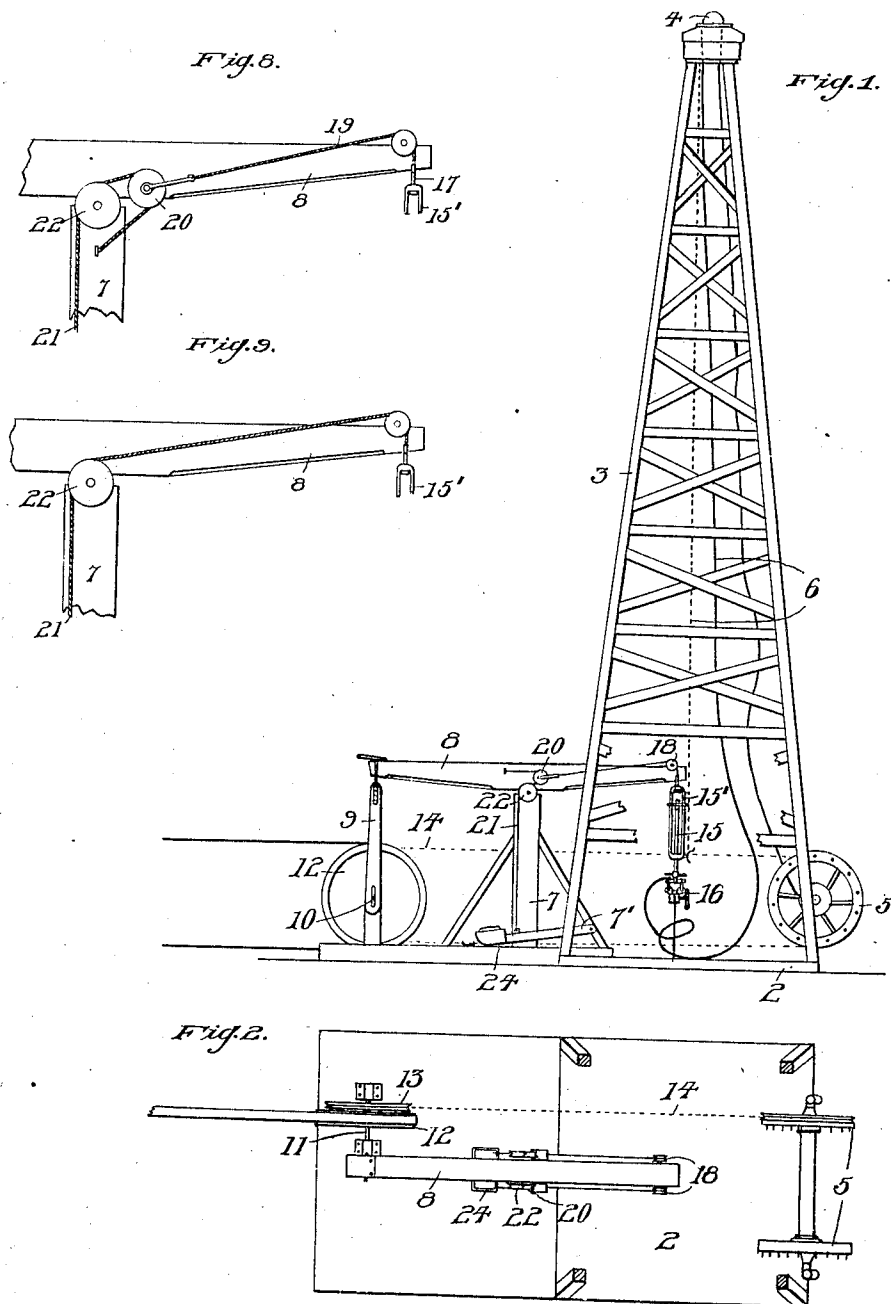
No. 872,128.

PATENTED NOV. 26, 1907.

C. M. HEETER.
WELL DRILLING APPARATUS.

APPLICATION FILED OCT. 9, 1905.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 3.

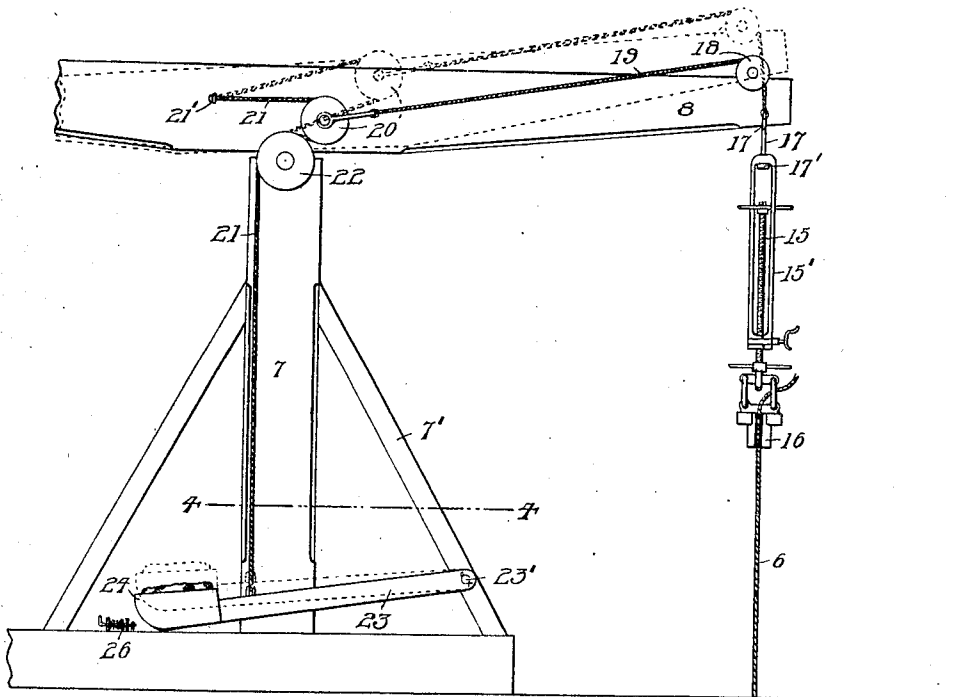


Fig. 4.

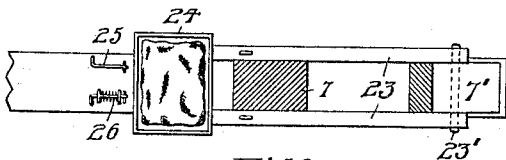


Fig. 6.

Fig. 5.

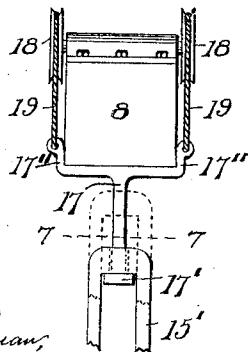
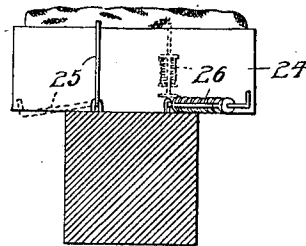
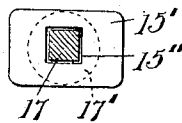


Fig. 7.



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UNITED STATES PATENT OFFICE.

CHARLES M. HEETER, OF BUTLER, PENNSYLVANIA.

WELL-DRILLING APPARATUS.

No. 872,128.

Specification of Letters Patent.

Patented Nov. 26, 1907.

Application filed October 9, 1905. Serial No. 281,973.

To all whom it may concern:

Be it known that I, CHARLES M. HEETER, a citizen of the United States, residing at Butler, in the county of Butler and State of Pennsylvania, have invented certain new and useful Improvements in Well-Drilling Apparatus, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to well drilling apparatus, and the primary object is to provide an improved compensating connection between the hole-forming mechanism and the actuating means, whereby when the tools
15 stick in the hole or for any reason offer such resistance to upward movement as might rupture or injure the drilling cable, beam, or jack-post, the improved mechanism becomes operative and compensates for the stroke of
20 the actuating means.

The improvement is designed primarily for use in connection with a walking-beam, and consists preferably of a vertically movable counterweight located beneath the beam and
25 adjacent the samson post and having flexible connection with the tool-suspending mechanism, said connection extending over suitable guides on the beam and comprising the only means for connecting the latter with the tool-
30 suspending mechanism.

While the invention may be used in conjunction with either wire or manila drilling cable, it is intended principally for the former which has little elasticity.

35 As the counterweight operates to hold the tool-suspending mechanism normally drawn upward tightly against the walking-beam, a further purpose of the invention is to so construct the suspending mechanism as to provide for vertical play, whereby when unhitching said mechanism from the drilling
40 cable for adjusting the temper-screw or for any other purpose, the play thus afforded will prevent the temper-screw and other portions of the apparatus from being injured by the excessive upward movement of the suspending mechanism preceding the unhitching operation.

In the accompanying drawings, Figure 1 is
50 a side elevation of well-drilling apparatus constructed in accordance with the invention, and Fig. 2 is a top plan view of the same. Fig. 3 is a view of a portion of the beam, illustrating the counterweight mechanism and the operation thereof. Fig. 4 is a

sectional plan view, taken on line 4—4 of Fig. 3. Fig. 5 is a rear elevation of the counterweight device. Fig. 6 is a front end view of the walking-beam. Fig. 7 is a cross-sectional view of the tool-suspending mechanism, taken on line 7—7 of Fig. 6. Figs. 8
60 and 9 illustrate modifications of the counterweight connections.

Referring to the drawings, 2 designates the derrick-floor; 3 the derrick; 4 the crown-pulley; 5 the bull wheels upon which the drilling-cable 6 is wound; 7 the samson post; 8 the walking beam; 9 the pitman connecting the walking beam with crank 10 of the band-wheel shaft 11; 12 the band-wheel; 13 a
70 pulley carried by the band-wheel; and 14 a belt extending from the band-wheel to one of the bull wheels for actuating the latter.

The parts thus far referred to are of usual and well known construction, and for which
75 no novelty is claimed.

The mechanism for suspending the drilling cable from the walking beam consists of temper-screw 15, from which is suspended clamp 16 in which the drilling cable is secured.
80 Reins 15' of the temper-screw are provided at their upper end with an angular aperture 15" through which passes the angular stem 17, with head 17' at its lower end, and the oppositely projecting upwardly turned arms 17'.
85 at its upper end which embrace the under side of the outer end of the beam, as clearly shown in Fig. 6. Carried by the outer end of the beam are sheaves 18, and passing there-
90 over are lines 19 which extend backward along the beam. In the preferred construction, each of these lines carries at its rear end a sheave 20 which engages a line 21. Lines 21 are shown anchored at their upper ends to the beam at 21', and beneath sheaves 20 they
95 pass downward around sheaves 22 to arms 23, pivoted at 23' to one of the samson post braces 7' and carrying the counterweight 24. Sheaves 22 are preferably journaled coincident with the beam fulcrum.

100 In the present embodiment of the invention, the hole-forming mechanism consists of or includes the temper-screw, clamps, drilling-cable, and drilling tools, the latter not being shown.

105 In operation, the pull of counterweight 7 is somewhat greater than that of the hole-forming mechanism so that the latter is held normally drawn upward against the beam, as clearly shown in Fig. 6 and in full lines in Fig. 110

3. If however, the tools stick in the hole, or for any other reason the pull of the tool-suspending mechanism exceeds that of the counterweight, the upward movement of the beam will simply operate to raise the counterweight, the beam moving upward and away from the tool-suspending mechanism, as shown in dotted lines in Fig. 3. The danger of breaking or unduly stretching the cable or injuring the actuating mechanism is thus avoided.

Sheaves 20 are merely provided for increasing the power so that the counterweight may be lighter than where the connection is direct as shown in Fig. 9, although the direct connection may be used if preferred. Instead of anchoring line 21 to the beam, it may be secured to the samson post, as shown at 21" Fig. 8.

When operating the jars, at which time a solid or non-compensating stroke is usually desired, the counterweight may be rendered inoperative by securing the same against vertical movement by hook 25. If at such time, slight compensation is desired, the counterweight may be secured by the spring-hook 26.

For unhitching or disconnecting the suspending mechanism, as when the temper-screw has been paid out, making it necessary to raise the same within reins 15' for a new hold in order to continue the drilling operation, belt 14 is adjusted and the bull wheels rotated, thereby winding up the slack cable, the latter then extending straight upward from the tool-suspending mechanism, as shown in dotted lines in Fig. 1, for the purpose of sustaining the tools, the suspending mechanism including the temper-screw being thus freed of the weight of the latter. In thus drawing upward on the cable, it is not always possible to shut off the power the instant the suspending mechanism has been relieved of the weight, and as the latter bears upward against the beam, it might be injured in the absence of provision for taking up the excessive upward movement of the drilling cable. The necessary compensation is had by the temper-screw reins 15' moving upward on stem 17 as shown in Fig. 6. With the suspending mechanism thus freed from the weight of the tool, the clamp may be released and the temper-screw run back, after which the clamp is readjusted, the hold of the bull wheels is released and the operation proceeds. The described operation is that which is usual in the operation of well drilling apparatus, and in this connection no claim is made for the mechanism employed, excepting that of novel construction at the upper end of the temper-screw.

While the invention is here shown in its preferred embodiment, the same may be variously arranged, particularly with reference to counterweighting the drilling cable so that the actuating means will operate either the

drilling cable or the counterweight, as the case may be.

I claim:—

1. In well drilling apparatus, hole-forming mechanism, a counterweight heavier than said mechanism, lifting means, and a connection between the hole-forming mechanism and counterweight, said connection having movable union with the lifting means.

2. In well drilling apparatus, the combination of hole-forming mechanism, a counterweight heavier than said mechanism, a flexible connection between the latter and counterweight, and actuating means movably connected to said flexible connection.

3. In well drilling apparatus, the combination of hole-forming mechanism, a counterweight heavier than said mechanism, vertically oscillating actuating means above the counterweight, a flexible connection between the hole-forming mechanism and the counterweight, the flexible connection being movably secured to the actuating means, and a guide for said connection coincident with the axis of the actuating means.

4. In well drilling apparatus, the combination of hole-forming mechanism, a walking-beam, a counterweight lower than the walking-beam and heavier than said mechanism, a flexible connection between the latter and the counterweight, and guides for directing said flexible connection over the walking-beam.

5. In well drilling apparatus, the combination of a samson post, a walking beam fulcrumed thereon, a counterweight, tool-suspending mechanism, a flexible connection between the counterweight and said mechanism, and guiding means coincident with the beam fulcrum and at the outer end of the beam for movably directing said flexible connection.

6. In well drilling apparatus, the combination of a walking beam, a counterweight, a sheave having fixed position, a line passing over the sheave with one end anchored and the other end connected to the counterweight, a movable sheave engaging said line between the said fixed sheave and the anchored end of the line, tool-suspending mechanism, and a line connecting the tool-suspending mechanism and the movable sheave.

7. In well drilling apparatus, the combination of tool-suspending mechanism, a counterweight connected thereto, means for securing the counterweight against upward movement, and actuating means having a movable connection with said mechanism and the counterweight.

8. In well drilling apparatus, the combination of a walking-beam, a two-part tool-suspending device bearing upwardly against the beam, a vertically movable connection between the parts of said device, whereby one has vertical play upon the other, and means

for holding the upper member of said device normally drawn upward against or in engagement with the beam.

5 9. In well drilling apparatus, the combination of a walking beam, a two-part tool-suspending device, a vertically movable connection between the parts of said device whereby one part may move upward or downward with relation to the other, a counterweight,
10 and a connection extending from the counterweight to said two-part device for holding the latter normally drawn upward against the walking beam.

10. In well drilling apparatus, the combi-

nation of a cable for suspending the tools, 15 counterbalancing means heavier than the cable and tools and connected to the cable, and a walking beam movably connected to both the cable and counterbalancing means and adapted on its up-stroke to lift either the 20 cable and tools or the counterbalancing means.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES M. HEETER.

Witnesses:

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J. M. NESBIT.