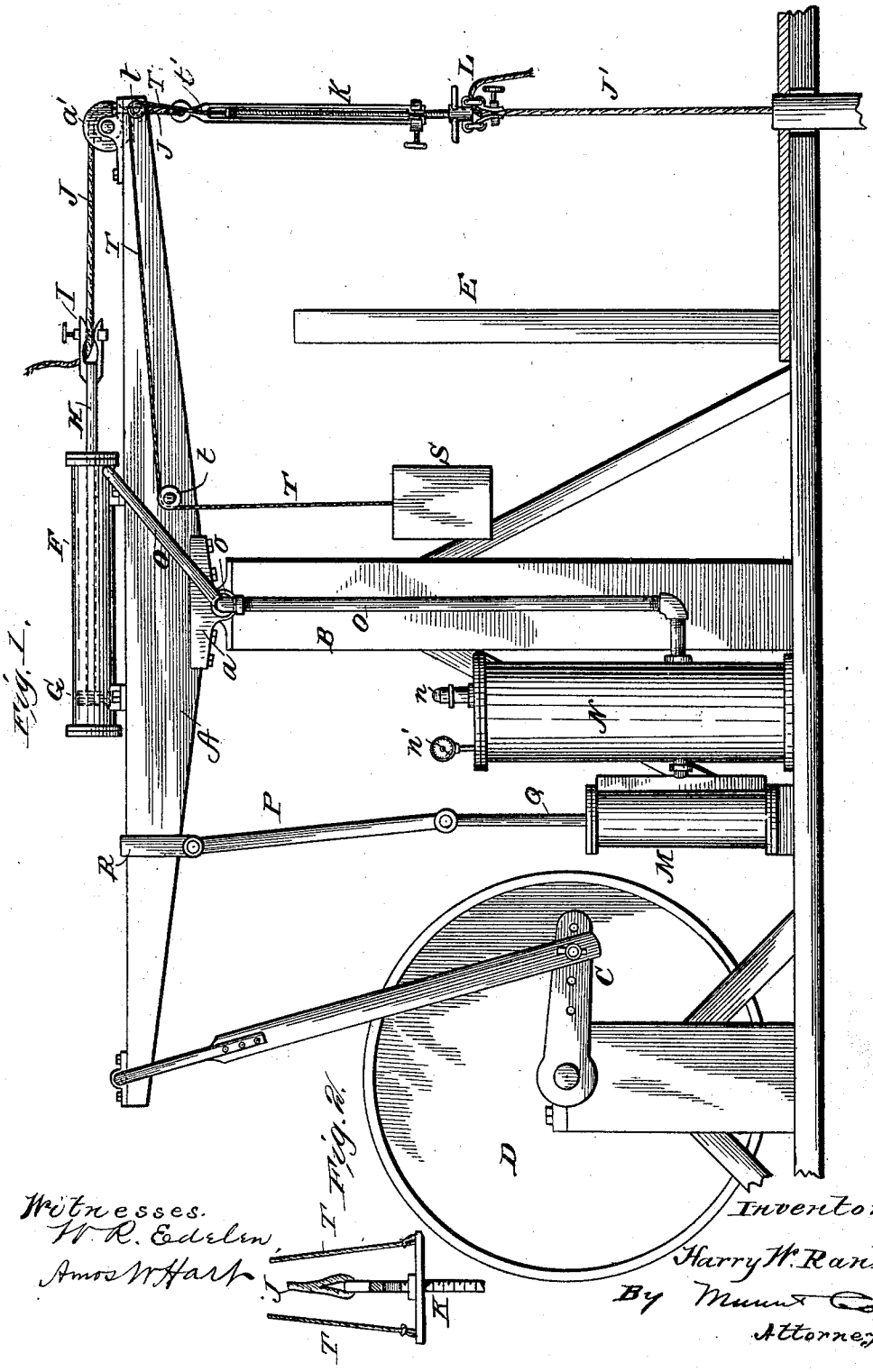
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H. W. RANK.

PNEUMATIC BALANCING ROPE TENSION ATTACHMENT.

APPLICATION FILED JUNE 29, 1901.

NO MODEL.



Witnesses.
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UNITED STATES PATENT OFFICE.

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PNEUMATIC BALANCING ROPE-TENSION ATTACHMENT.

SPECIFICATION forming part of Letters Patent No. 719,370, dated January 27, 1903.

Application filed June 29, 1901. Serial No. 66,559. (No model.)

To all whom it may concern:

Be it known that I, HARRY W. RANK, a citizen of the United States, residing at McDonald, in the county of Washington and State of Pennsylvania, have invented an Improved Pneumatic Balancing Rope-Tension Attachment, of which the following is a specification.

In well-drilling apparatus as usually constructed the rope to which the drill is attached is subject to a sudden and severe strain at each lift or rise of the reciprocating or oscillating part to which the rope is connected. In the case of a Manila or hemp rope there is considerable spring or elasticity and stretch; but wire ropes have no elasticity, yet their use is a practical necessity in wells of great depth.

It is the object of my invention to provide an elastic tension attachment for such ropes, so that the lift may be easy at the same time that the momentum of the tools in the downward movement permits a harder blow to be struck than if the attachment were a rigid one, and to this end I employ a pneumatic apparatus constructed and arranged to operate as hereinafter described, and shown in accompanying drawings, in which my invention is shown applied to a walking-beam and other parts such as are usually employed in well-drilling.

Figure 1 is a side view of the entire apparatus. Fig. 2 is a detail view, partly sectional, illustrating the connection of the clamps or temper-screw with other parts.

The walking-beam A is supported upon a saddle *a*, which is pivoted upon the top of a "samson-post" B and is oscillated vertically in the usual way by a suitable crank connection C with a bull-wheel D.

E indicates a post, commonly called "deadman's post," which is set vertically under one portion of the walking-beam A and is used as a means of safety for the drillers or men working under the beam in case the latter should break at the center. There is nothing new in the construction and arrangement of the parts thus far described.

F indicates a cylinder arranged and secured upon the walking-beam A in line therewith, and a piston G (shown in dotted lines) is adapted to work therein and provided with a rod H, having a clamp I at its outer end. The rope or chain J is secured by the clamp I and passes over a pulley *a'*, journaled on the adjacent end of the walking-beam, and is attached to the head of a temper-screw K, which is applied in the usual way and provided with a clamp L for holding the ropes that extend down in the well and is connected with the drill. Air is forced into the cylinder F and retained therein under due pressure. The piston G, acting against the elastic cushion thus formed, provides a corresponding elastic tension for the wire rope J, which allows the latter to yield more or less when subjected to the sudden lifting strain incident to the oscillation of the walking-beam A. In other words, the rope J' yields or "gives" in place of having a dead or solid pull whenever the end of the walking-beam is raised. In other words, the temper-screw is allowed to work up and down as required by the variation of strain on the rope J', and yet the temper-screw may be adjusted and manipulated as usual.

While I show the preferred arrangement of a pneumatic cylinder F with reference to the beam, it is obvious that changes may be made to a degree without departing from the spirit of the invention.

As a means for supplying air to the cylinder F, I employ a pump M, an air-reservoir N, and a pipe O. The pump is operated by suitable connection with the walking-beam A, which is effected in this instance by a connecting-rod P, jointed at its respective ends to the pump piston-rod Q and a clevis R, secured to the beam A. The compressed-air reservoir N is provided with a safety-valve *n* and a gage *n'*. The pipe O is jointed at *o* and provided with an extension, which is attached to the cylinder F. It is apparent that the joint *o* must be the center of oscillation of the cylinder F. By the means described any required degree of pressure may be maintained in the cylinder F, and this pressure is varied according to various conditions.

I do not limit myself to air as the medium for applying elastic tension, but intend to employ steam or any other gaseous fluid that may suit the purpose.

A weight S is shown suspended by rope P, passing over pulleys *p* on the walking-beam

A and connected at T′ with the temper-screw K for balancing the temper-screw.

What I claim is—

1. In a well-drilling apparatus, the combination with a drill-rope, and an oscillating beam, of a pneumatic cylinder on said beam, a piston sliding in said cylinder and having a rod, means for connection with a drill-rope, the cylinder being filled with air on the front side of the piston, whereby the latter reciprocates as the beam oscillates and the drill-rope slackens and tightens, as shown and described.

2. In a well-drilling apparatus, the combination with the drill-rope and a beam pivoted and adapted to oscillate vertically, of a pneumatic cylinder secured upon and oscillating with the beam and having a piston, a rope connected with the piston and passing over a pulley on the adjacent end of the beam, and means for connecting such rope with a drilling apparatus proper, as shown and described.

3. In a well-drilling apparatus, the combination of a pneumatic cylinder, its slidable air-cushioned piston having a rod adapted for attachment of a drilling device, an air-pump having a slidable piston, a pipe connecting said pump with the front end of the aforesaid cylinder, an oscillating beam supporting the pneumatic cylinder, and means connecting the beam with the piston of the pump, for reciprocating said piston coincidently with the oscillation of the beam and the up-and-down movement of the drilling attachment proper, as shown and described.

4. In a well-drilling apparatus, the combination with the oscillating beam and drill-rope, of a pneumatic cylinder mounted on said beam and having a piston, means for connecting the latter with said rope, an air-pump, means whereby to operate the pump and a pipe connecting the latter with the cylinder, the said pipe being jointed coincidently with the beam-pivot, substantially as shown and described.

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Witnesses:
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