Jan. 3, 1933. T. L. GOFF 1,893,408

SHOCK ABSORBING DERRICK MAST FOR WELL DRILLING MACHINES

Filed July 3, 1931

Fig. 1.

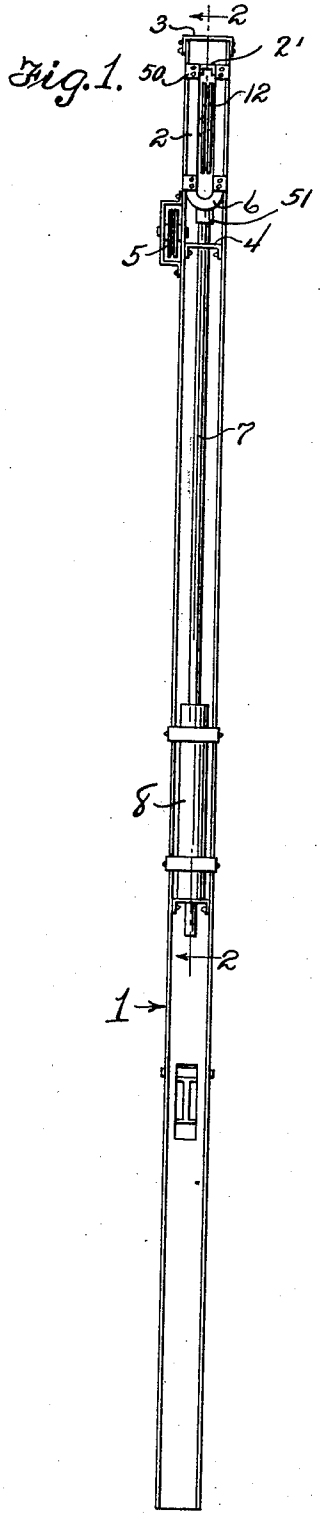


Fig. 2.

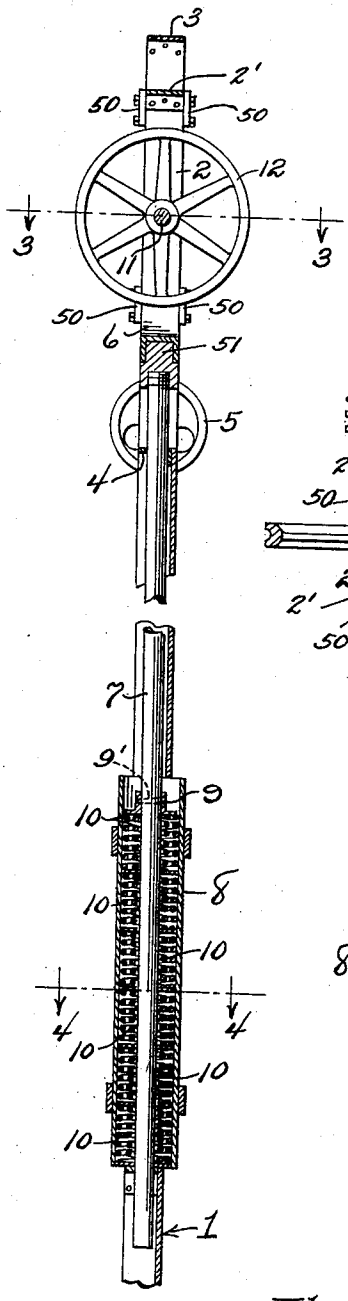


Fig. 5.

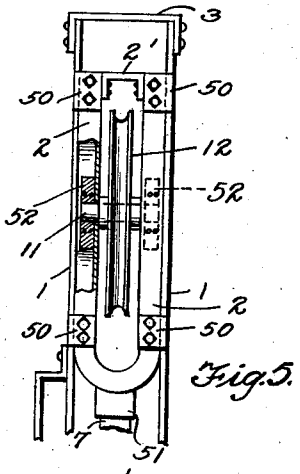


Fig. 3.

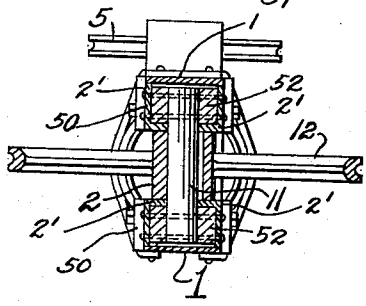
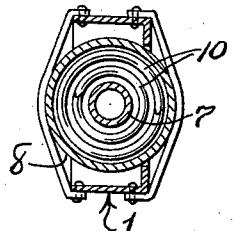


Fig. 4.



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UNITED STATES PATENT OFFICE

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SHOCK ABSORBING DERRICK MAST FOR WELL DRILLING MACHINES

Application filed July 3, 1931. Serial No. 548,639.

My present invention has reference to drilling machines for artesian and oil wells, and is in the nature of an attachment for the masts of such machines, the object being the provision of a simple, practical and efficient means for portable drilling machines which will enable the employment of a steel cable and which will absorb shocks during the drilling operation to take the jerk out of the machine and increase the durability thereof.

A further object is the provision of a shock absorbing means for drilling machines which will permit of the employment of wire cables in lieu of the manila ropes which are generally employed in connection with such devices and which will afford the same yieldability to the wire cable, as is afforded by the employment of the manila rope.

To the attainment of the foregoing the invention resides in the improvement hereinafter described and definitely claimed.

In the drawing:

Figure 1 is an elevation of a mast of a drilling machine equipped with the improvement.

Figure 2 is an enlarged sectional view approximately on the line 2—2 of Figure 1.

Figure 3 is a sectional view approximately on the line 3—3 of Figure 2.

Figure 4 is a sectional view approximately on the line 4—4 of Figure 2.

Figure 5 is an enlarged elevation looking toward the upper end of the mast and better illustrating the slidable head on the mast.

It is well known to those skilled in the art of drilling that it is difficult to successfully employ a wire rope or cable for drilling purposes for the reason that such rope or cable is too rigid and has not sufficient spring to allow the string of tools to successfully work. It is further well known that when such wire cables or cords are employed the whole of the drilling machine is subjected to a severe strain as is the rope itself. The advantages of a wire rope or cable have been recognized on account of its durability and strength as well as cheapness in comparison with the manila cables which are ordinarily employed. It will be noted as the description progresses that my attachment for the masts of portable drilling machines has a shock absorber associated with the working head thereof to permit of the head and the crown pulley which is journaled in the head moving longitudinally when under strain, and thus compensating for such strain and for the shocks and jars to which it is ordinarily subjected when a wire rope or cable is employed.

As the improvement is directed entirely to the mast of a drilling machine only this portion of a drilling machine has been illustrated by the drawing. As disclosed by the drawing the mast 1 comprises two spaced plates. In the upper portion of the mast there is arranged a longitudinally movable working head 2. The head 2 is in the nature of a U-shaped channeled iron and has its parallel arms, at its upper end, spaced by a channeled member 2′ whose depending flanges are secured to the inner and closed faces of the said arms. The sides of the U-shaped head 2 at and adjacent to the lower end thereof have bolted thereon guide plates 50 and these plates are in contacting engagement with the edges of the spaced members 1 that comprise the mast. The plates 50 are thus in the nature of guides for the head 2. The head is limited in its outward movement by contact with the end 3 of the mast and in its lower movement by contact with a stop element 4 that is carried by the mast. The stop element is arranged adjacent to the sand line pulley 5, whose shaft is journaled in a suitable bracket on one side of the mast. In the lower and curved end of the U-shaped head there is arranged and fixed a block 51, and in this block there is screwed or otherwise secured the upper end of a rod 7. This rod is received and passes through the lower and closed end of a cylinder 8 which is suitably secured to the mast and held from movement in any direction. On the rod 7, at the portion thereof received in the tube 8 there is a flanged collar 9 which is designed to be contacted by the upper convolutions of interposed coil springs 10, respectively, the lower ends of the springs being in contact with the closed bottom of the tube 8. The collar 9 is fixed on the rod 7 by a pin or like element 9′. The head 2 has journaled through the

parallel arms thereof the shaft 11 for the crown pulley 12 over which the tool operating wire rope or cable is trained. Wooden bearing blocks 52 for the ends of the shaft 11 are arranged in the channeled sides of the head 2 and are bolted, riveted or otherwise secured therein.

With my improvement it will be noted that the working head and the crown pulley will yield under the strain incident to the shocks and jars imparted thereto by the drill bars; that the pulley and head will yield to retain the wire rope or cable in its travel thereover and thereby effectively hold the cable in the crown pulley, and likewise add to the flexibility of the rope or pulley. The encased springs are not liable to breakage by crystallization and the device absorbs the shocks and jars to an extent that will prevent the breakage of the machine which, of course, includes the mast and likewise prolong the life of the wire rope or cable.

It will thus be noted that the important feature of my improvement is the spring system in which the sets of springs, of ample strength are prevented from crystallization and are of sufficient number to give the necessary resilience for proper drilling motion. The stop below the working head is for safety in case the springs or pipe should break and does not necessarily limit the movement of the working head under working conditions. The device is designed for use in connection with oil wells, water wells, blast hole and prospect drilling machines.

Having described the invention, I claim:

In a drilling machine, a mast, a working head guided for longitudinal movement in the mast, stop means for limiting the longitudinal movement of the working head, a crown pulley for a wire cable journaled in the working head, a rod extending from the bottom of the working head, a tubular member having a lower closed end fixedly supported on the mast and through which the rod passes, a flanged collar on the rod at the portion thereof received in the tubular member and internested coiled springs surrounding the rod and exerting a pressure between the bottom of the tubular member and the flanged collar on the rod.

In testimony whereof I affix my signature.

THOMAS L. GOFF.