Feb. 18, 1969 W. E. JONES 3,427,887

PUMPING UNIT WITH SPRING CONNECTED PITMAN

Filed June 3, 1966

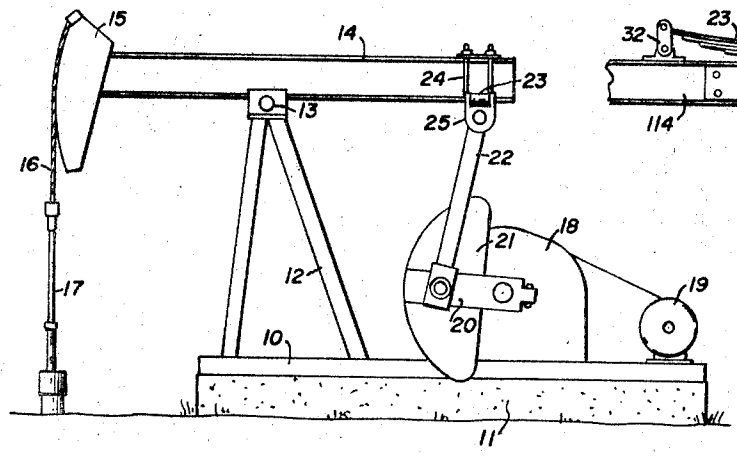


FIG. 1.

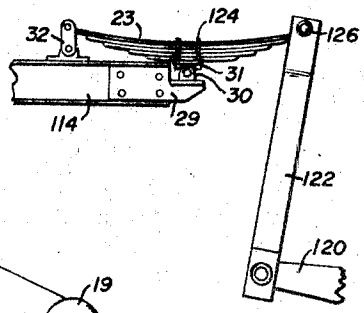


FIG. 4.

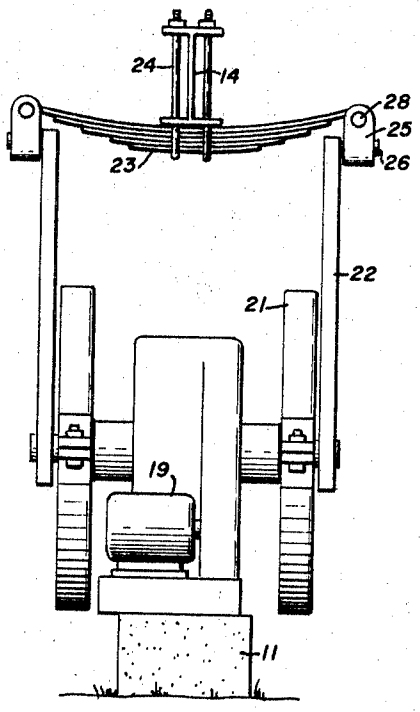


FIG. 2.

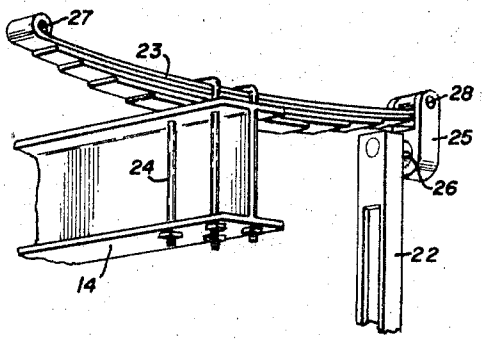


FIG. 3.

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PUMPING UNIT WITH SPRING CONNECTED PITMAN

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ABSTRACT OF THE DISCLOSURE

A pumping united wherein a walking beam is pivotally balanced intermediate its ends, a mulehead on one end of the beam and an extending leaf spring on the other end, rotary drive means beneath the beam and a pitman connecting said means with an extending end of the leaf spring. In its preferred form the construction has two separate pitmans and the leaf spring is transversely mounted on the beam.

This invention relates to pumping units for oil wells and has reference to springs for dampening shock pulses in sucker rod strings.

Heretofore, helical compression springs were installed directly above the well by mounting the springs between upper and lower plates. The lower plate was connected with the bridle cable of the pumping unit and the upper plate was connected with the polished rod which supports the rod string. The present invention is directed to the installation of a leaf spring between the pitman or pitmans and the walking beam of a pumping unit and whereby the frictional action of the leaves tends to reduce rebound. Also, by mounting the spring at the pitman end of the walking beam, the inertia of the beam lends to the dampening action on the sucker rods.

The primary object of the invention is to provide improved means for dampening shock pulses in sucker rod strings.

Another object is to reduce the cost of operating a pumping well by reducing shutdown time for repairs.

A further object is to reduce breakage and parting of rods in a pumping well.

These and other objects of the invention will become apparent from the following description and the accompanying drawing, in which:

FIGURE 1 is a side elevational view of pumping unit including a preferred form of the invention.

FIGURE 2 is an enlarged end elevational view of the pumping unit illustrated in FIGURE 1.

FIGURE 3 is a broken perspective view of an end of a walking beam and a pitman and showing an alternate means of mounting the spring, and

FIGURE 4 is a broken side elevational view of a modified form of the invention.

Referring now to FIGURES 1 and 2, the pumping unit shown includes a base frame **10** on a concrete foundation **11**, a samson frame **12** and a saddle bearing **13** on top of the samson frame. The saddle bearing **13** pivotally supports a walking beam **14** which has a mulehead **15** on its forward end. A bridle cable **16** on the mulehead **15** is connected with the upper end of a polished rod **17**, all in the usual manner. The speed reducer **18**, motor **19**, cranks **20**, counterweights **21** and pitmans **22** are also conventional and are not, therefore, herein described in detail.

The primary feature of the invention as illustrated in FIGURES 1–3 is directed to a semi-elliptical leaf spring **23** which is transversely mounted on the walking beam **14** on the end thereof opposite the mulehead **15**. In addition to the spring action to be described, the spring **23** also serves as an equalizer beam for the two pitmans **22**. As shown in FIGURES 1 and 2, the spring **23** is secured to the bottom of the walking beam **14** by U-bolts **24**, but in FIGURE 3 the spring is mounted on top of the beam and in which case the position of the U-bolts is reversed.

The upper ends of the pitmans **22** are connected with the extending ends of the springs **23** by bearing blocks **25**. Laterally extending wrist pins **26** on the upper ends of the pitmans **22** are journaled in the lower portions of the bearing blocks **25**, whereas the upper portions of the blocks are bifurcated to receive the ends of the spring **23**. The ends of the spring **23** are rolled to form eyes **27** which receive hinge pins **28** that also extend through the bifurcated portions of the bearing blocks **25**.

The form of the invention illustrated in FIGURE 4 has to do with adapting the spring **23** to that type of pumping unit having a single crank **120** and a single pitman **122**. Here, the end of the walking beam **114** opposite the mulehead **15** is shorter where it is provided with at least one bracket plate **29** on its side for supporting a bearing assembly **30**. The bracket plate **29** extends beyond the end of the walking beam **114** where it is offset to support the bearing assembly **30** at a level whereby the latter's axis is approximately level with the top of the beam. A pivoted plate **31**, as part of the assembly **30**, supports the center of the spring **23** parallel with the length of the walking beam **114**. U-bolts **124** are connected with the plate **31** and hold the spring in place. The forward end of the spring **23** is connected with the top of the walking beam **114** by a shackle **32**, whereas the remaining end of the spring is pivotally connected with the top of the pitman **122** by a wrist pin **126**.

In the operation of either described form of the invention, at the end of each stroke the reversing movement of the rod string is dampened by reason of the action of the leaf spring **23**. Because of the location of the spring **23** and its leaf action, rebound is less likely than in the action of coil springs parallel with the length of the sucker rod string.

The invention is not limited to the exemplary constructions herein shown and described, but may be made in various ways within the scope of the appended claims.

What is claimed is:

1. In a well pumping unit including a beam pivotally mounted intermediate its ends for oscillating movement in a vertical plane and including at least one crank driven vertically extending pitman generally beneath said beam, a mulehead on one end of said beam, a leaf spring rigidly mounted at its thickest part on said beam on the end thereof opposite said mulehead and extending therefrom and means pivotally connecting an extending end of said spring with the vertically extending end of said pitman.

2. In a well pumping unit as defined in claim **1**, the construction wherein there are two said pitmans on opposite sides of said beam and parallel with each other, and wherein said leaf spring is transversely mounted on said beam and wherein the extending ends of said spring are pivotally connected with the vertically extending ends of said pitmans.

3. In a well pumping unit as defined in claim **1**, the construction wherein there is one said pitman, and where-

in said spring on said beam is parallel with the length thereof.

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