

May 4, 1937.

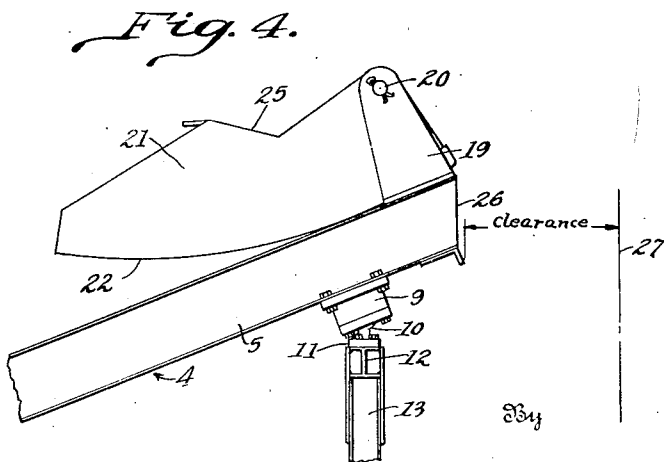
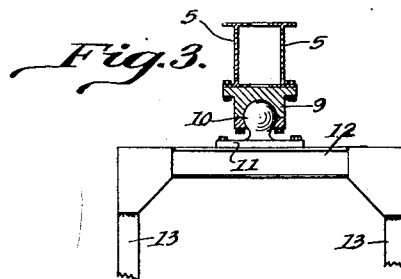
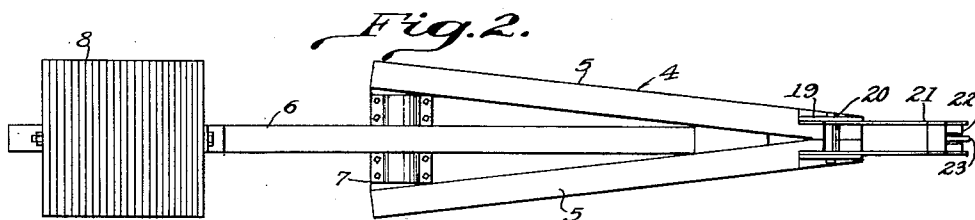
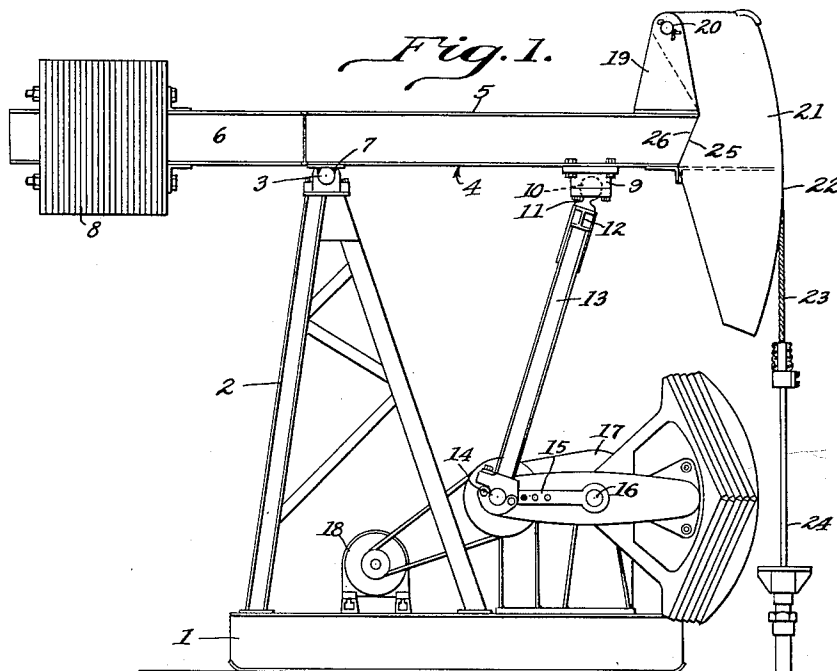
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2,079,276

WALKING BEAM MECHANISM

Filed July 19, 1935

2 Sheets-Sheet 1



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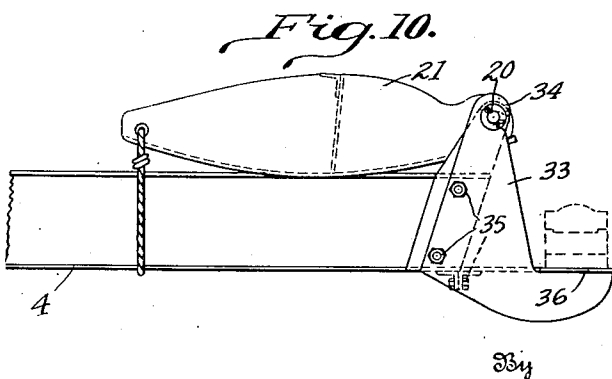
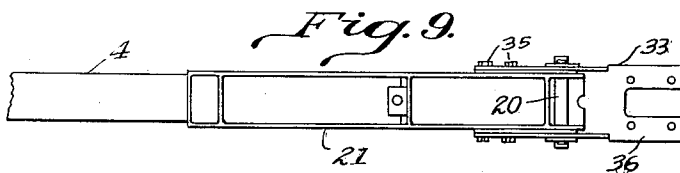
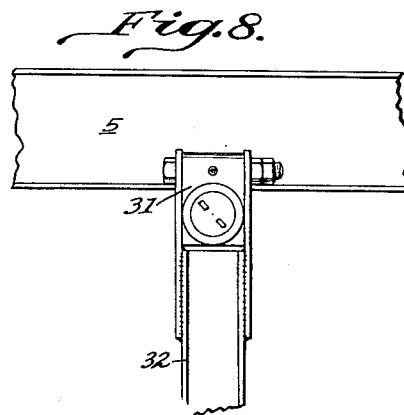
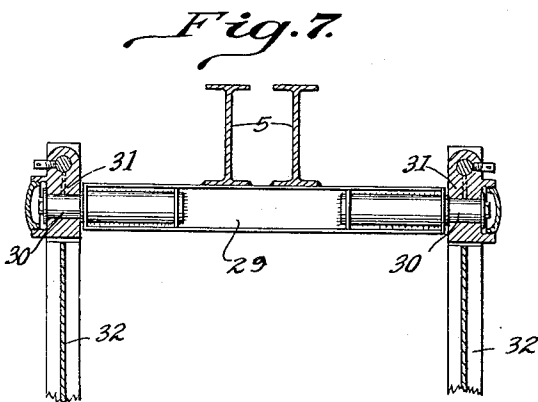
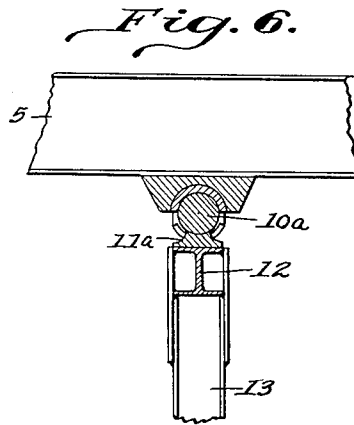
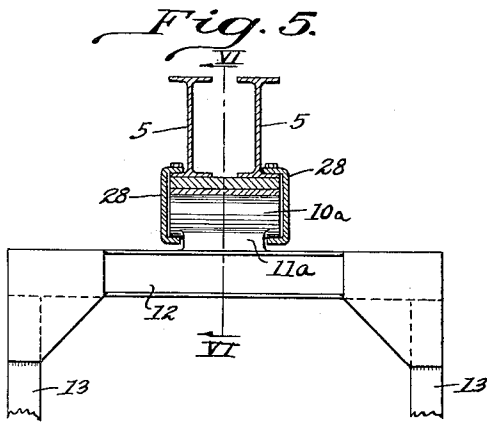
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2,079,276

WALKING BEAM MECHANISM

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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WALKING BEAM MECHANISM

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Application July 19, 1935, Serial No. 32,240

8 Claims. (Cl. 74-41)

This invention relates to well pumping mechanism and comprises a walking beam mounted to oscillate in a vertical plane, pitman means for actuating the same and twin crank mechanism for effecting the operation of the pitman and the oscillation of the walking beam connected therewith.

The object of the invention is to provide certain improvements in pumping apparatus of this type which will be particularly pointed out in connection with the accompanying drawings which illustrate the preferred embodiment thereof.

In the drawings:

Fig. 1 is a view in side elevation illustrating the pumping apparatus comprising the present invention;

Fig. 2 is a top plan view thereof;

Fig. 3 is a vertical transverse sectional view disclosing the ball and socket connection between the upper end of the pitman yoke and the walking beam;

Fig. 4 is a detail side elevation of the pivoted cable receiving head of the walking beam;

Fig. 5 is a transverse vertical sectional view disclosing a modified form of connection between the pitman yoke and the walking beam;

Fig. 6 is a vertical sectional view on the line VI-VI of Fig. 5;

Fig. 7 is a transverse sectional view of a still further connection;

Fig. 8 is a side elevation of the mechanism disclosed in Fig. 7;

Fig. 9 is a plan view of the forward end of the walking beam with the cable receiving head in an inactive position and a different type of beam hanger bearing attached to the end of the walking beam;

Fig. 10 is a side elevation of the mechanism shown in Fig. 9.

Referring more particularly to the drawings, and especially to Figs. 1 to 4 thereof, my improved well pumping mechanism comprises a base frame 1 from one end of which arises a rigid A frame 2, composed preferably of structural steel members. Pivotaly supported on the upper end of the frame 2 as at 3 is a walking beam 4.

In the form of the invention illustrated, the walking beam comprises a pair of forwardly converging side members 5 and a centrally disposed longitudinally extending member 6. The members 5 and 6 are transversely united by the member 7 which carries the bearings 3. If desired, the central member 6 may be extended rearwardly of the frame 2 and suitably counter-weighted as by the disk assembly 8.

The forward converging ends of the members 5 are, as shown in Fig. 3, provided at their undersides with a socketed bearing 9 in which is received the substantially spherical head 10 of a

bracket 11 which, in turn, is secured to the transversely extending upper portion 12 of a pitman yoke 13. The lower ends of the vertically extending side members of the yoke 13 are pivotaly connected as at 14 to a pair of counter-weighted cranks 15, carried by the opposite ends of a shaft 16, the latter being suitably rotated by transmission gearing, not shown, disposed within a casing 17 mounted on the base frame 1 and driven by an appropriate motor 18 also preferably mounted on the base frame.

Connected with the forward ends of the walking beam is a rigid upwardly extending bracket 19 to which is pivotaly connected as at 20 a cable receiving head 21. The outer face 22 of the head 21 is curved on an arc whose center comprises the pivotal axis 3, and secured to the curved face 22 is the upper end of a cable 23 from which is suspended the usual pump operating rods 24. The opposite side of the head 21 as regards the face 22, is angularly formed as at 25, and engages with the corresponding, angular under-cut forward end 26 of the walking beam. As shown in Fig. 4, when the walking beam is not in use, the head 21 may be rocked about its point of pivotal connection 20 with the bracket 19 to assume an inactive position resting upon the top of the walking beam, so that it will lie within the length of the walking beam, thereby providing considerable clearance between the forward end of the walking beam and the vertical axis 27 of the associated well, so that ample room will be provided to enable the well pumping tools, casing or tubing to be removed without interference on the part of the walking beam and its associated mechanism.

In the form of the invention disclosed in Fig. 5, the bracket 11a is provided with a cylindrical head 10a rather than the spherical head disclosed in Fig. 3, and end plates 28 are carried by the side members of the walking beam and engage with the ends of the head 10a to preserve alignment of parts. In Figs. 7 and 8, a further modified form is disclosed wherein the flanges of the walking beam are provided with transverse sills 29 which terminate in trunnion studs 30, the latter being received within lubricated bearings 31 pivotaly carried by the upper ends of the pitman rods 32.

Figs. 9 and 10 show the forward end of the walking beam 4 with the cable receiving head 21 secured in an inactive position and a different type of beam hanger bearing 33 secured to the beam 4. The beam hanger bearing 33 is used with the rod rein type of beam-hanger and is formed with hooks 34 at its upper end which receive the pivot for the cable head 21. The bearing is further secured to the beam by bolts 35. The forward portion of the member 33 is provided with a horizontal shelf 36 to which is secured a bearing

(shown in dotted lines). The member 33 may be attached to and used with the beam without the necessity of removing the head 21.

The constructions described provide a long stroke walking beam wherein the pitman connections are disposed in advance of the point of pivotal support of the walking beam on a Samson post or frame. In ordinary walking beam construction, it is customary to dispose the Samson post and the pivotal support of the walking beam between the pitman connections and the working head of the beam. This conventional construction, however, results in imparting a comparatively short stroke to the walking beam which I overcome by the arrangement disclosed in Fig. 1. By moving the pitmans forwardly in advance of the Samson frame, the same are placed under compression during the up stroke of the walking beam which forces are absorbed by the strong construction of the pitmans and the manner of connecting the same with the under side of the walking beam.

The present invention constitutes a continuation-in-part of the disclosures set forth in my prior application, Serial No. 20,429 filed May 8, 1935.

What is claimed is:

1. In well pumping mechanism, a walking beam embodying forwardly converging side members arranged in a substantially horizontal plane, a Samson post, bearings pivotally uniting the spaced rear ends of said side members with said post, a base frame on which said post is rigidly mounted, a power driven shaft having twin crank arms rotatably mounted in connection with said base frame, pitmans having their lower ends pivotally connected with said crank arms, a pivotal connection uniting the upper portions of said pitmans with the under side of said walking beam contiguous to the outer or forward end of the latter, and a cable head having an arcuate outer surface carried by the outer or forward end of said walking beam.

2. In well pumping mechanism, a walking beam composed of forwardly converging side members arranged in a substantially horizontal plane, a pivoted support for the rear ends of said side members providing for oscillation of the walking beam in a vertical plane, a power driven shaft carrying twin crank arms at its outer ends, a U-shaped pitman having the lower ends thereof pivotally connected with said crank arms, a bearing secured to the under side of said walking beam adjacent to its outer or forward end, said bearing being provided with a substantially spherical socket, and a substantially spherical head rigidly connected with the upper portion of said pitman and seated in said bearing socket.

3. In well drilling and pumping mechanism, a base frame, a Samson post provided upon said frame, a walking beam pivoted on the upper end of said Samson post, bracket members carried at the outer end of said beam, an arcuate cable receiving head, means for pivotally securing said head to said bracket members for rocking movement to a position within the length of said beam, and a beam hanger bearing formed with hook means at its upper end for connection with the pivot for said head.

4. In well pumping mechanism, a walking beam embodying forwardly converging side members arranged in a substantially horizontal plane, a Samson post, bearings pivotally uniting the spaced rear ends of said side members with said

post, a base frame supporting said post, a power driven crank shaft rotatably carried by said base frame, a pitman pivotally connected at its lower end with said crank shaft, a cable head having an arcuate outer surface carried by the forward end of said walking beam, and a pivotal connection uniting the upper portion of said pitman with said beam between said head and the pivotal mounting for said beam.

5. In well drilling and pumping mechanism, a base frame, a Samson post provided upon said frame, a walking beam embodying a pair of forwardly converging side members arranged in a substantially horizontal plane, pivot means uniting the spaced rear ends of said members with said post, a second beam member secured to said walking beam between said side members and in substantially the same plane, said second beam member extending rearwardly of said walking beam to a substantial distance beyond said pivot means, a cable head secured to said walking beam at its forward end, and counterbalance means carried by the rearwardly extending portion of said second beam.

6. In well drilling and pumping mechanism, a base frame, a power driven crank shaft provided upon said frame, a Samson post carried by said frame, a walking beam embodying a pair of forwardly converging side members arranged side by side, pivot means uniting the spaced rear ends of said side members with said post, a second beam member positioned between the spaced rear ends of said side members, said second beam extending rearwardly of said side members to a substantial distance beyond said pivot means, a cable head carried by the forward end of said walking beam, a pitman connected at its lower end to said crank shaft and pivoted at its upper end to said walking beam near said cable head, and counterbalance means carried by the rearwardly extending portion of said second beam.

7. In well drilling and pumping mechanism, a base frame, a Samson post provided upon said frame, a walking beam pivoted on the upper end of said Samson post, upwardly extending spaced bracket members carried by the forward end of said beam, an arcuate cable receiving head positioned between said spaced bracket members, pivot means extending through said bracket members and the upper end of said cable head whereby said head may be rocked about said pivot to a position above said beam, a beam hanger bearing provided at the forward end of said beam, said bearing being provided with spaced hook-shaped extensions which straddle said bracket members and engage said pivot means when said head is in an inactive position.

8. In well drilling and pumping mechanism, a base frame, a Samson post provided upon said frame, a walking beam pivoted on the upper end of said Samson post, upwardly extending spaced bracket members secured to the forward end of said beam, an arcuate cable receiving head positioned between said bracket members, pivot means uniting the upper end of said head with said bracket members whereby said head may be rocked to a position above said beam, and a downwardly and rearwardly inclined surface formed on the forward end of said beam to provide maximum clearance between the end of the beam and the vertical center of the well when said head is moved to an inactive position and the forward end of said beam is in an elevated position.

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