July 20, 1937. V. SJOLSETH 2,087,785

DRILLING MACHINE

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Fig. 2.

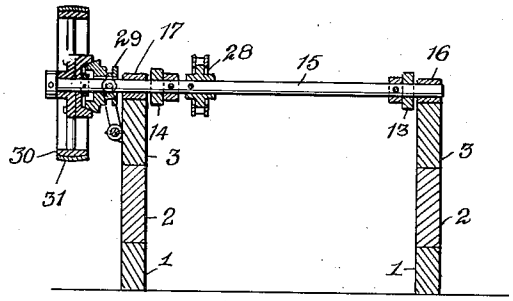

Fig. 1.

WITNESSES

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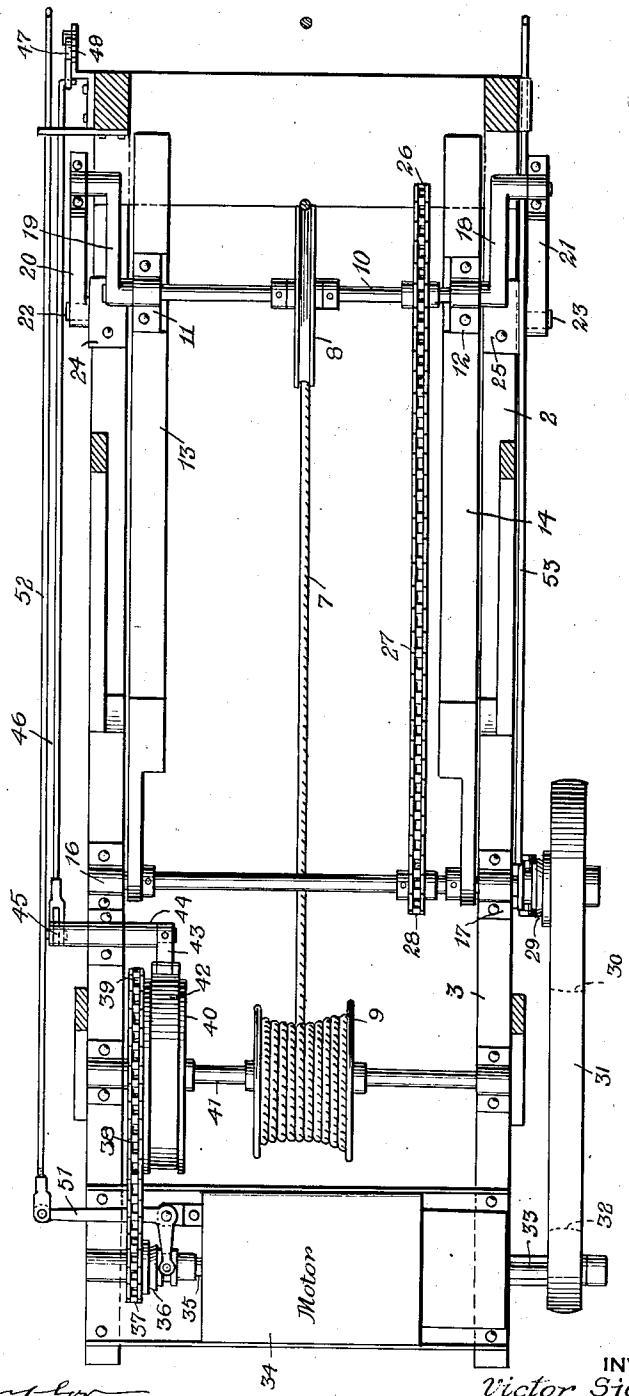

Fig. 3.

WITNESSES

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DRILLING MACHINE

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Application November 5, 1936, Serial No. 109,238

4 Claims. (Cl. 255—11)

This invention relates to drilling machines, and particularly to what is commonly known as a churn drilling device, an object being to provide a strong and simple construction wherein the weight of the walking beam structure acts to produce a smooth running action of the machine.

Another object of the invention is to provide a simplified arrangement wherein the spudding sheave is moved up and down with the walking beam through the action of a pitman and crank members coacting therewith.

An additional object is to provide a drill structure wherein the weight of the walking beams, spudding sheave and associated parts act to counterbalance the drilling tubes.

In the accompanying drawings:

Fig. 1 is a side view of a drilling machine disclosing an embodiment of the invention;

Fig. 2 is a transverse sectional view through Fig. 1 approximately on the line 2—2;

Fig. 3 is a sectional view through Fig. 1 approximately on the line 3—3, the same being on an enlarged scale.

Referring to the accompanying drawings by numerals, 1 indicates a pair of skids or runners on which a frame 2 is mounted. A sub-frame 3 is mounted on frame 2 at the rear part as shown particularly in Fig. 1. These frames may be braced, if desired, by suitable braces, and to frame 2 is connected the tower 4 having tower bracing beams 5. This tower structure forms what is commonly known as a derrick and has a crown sheave 6 at the upper end so as to accommodate the drill rope 7. The drill rope or cable 7 is adapted to have any desired kind of drilling tools connected at the lower end outside of the frame 2 while the opposite part passes over the spudding sheave 8 and thence to the drum 9. By rotating the drum 9 in one direction the cable 7 may be taken in when it is desired to raise the drilling tools. When it is desired to lower the drilling tools the drum 9 is released and the weight of the tools will allow the cable to pay out.

In order that the drill or drilling tools may be raised and lowered in the usual manner of a churn drill, the spudding sheave 8 is freely rotatable on the spudding shaft 10 which is journalled in suitable bearings 11 and 12 on the walking beams 13 and 14. These beams are pivotally mounted at the rear end on the intermediate shaft 15 which is journaled in suitable journal members 16 and 17 mounted on the subframe 3. The spudding shaft 10 extends through bearings 11 and 12 and has the respective cranks 18 and 19 keyed or otherwise rigidly secured thereto, said cranks being parallel and in alignment with each other. Pitmans 20 and 21 have their upper ends connected to the respective cranks and their lower ends pivotally connected at 22 and 23 respectively to the respective brackets 24 and 25 rigidly secured to frame 2. By this construction it will be readily seen that whenever shaft 10 rotates the cranks and pitmans will function and cause the walking beams 13 and 14 to swing upwardly and downwardly and cause the spudding sheave 8 to swing upwardly and downwardly.

A comparatively large sprocket wheel 26 is rigidly secured to the shaft 10 and accommodates a chain 27 which passes over a small sprocket wheel 28 rigidly secured to shaft 15. Whenever shaft 15 is rotated power will be transmitted through the chain 27 to sprocket wheel 28 and to shaft 10 for causing the walking beams and associated parts to function. In order that the shaft 15 may rotate when desired the same is connected through a clutch 29 to a comparatively large pulley wheel 30 actuated by the belt 31 passing over the small pulley wheel 32 rigidly secured to the shaft 33 that is driven by the motor 34. If the motor 34 is a gasoline engine or Diesel engine the shaft 23 might be an extension from the crank shaft of the engine. However, as far as the present invention is concerned the engine or motor 34 continually rotates shaft 33 while it is functioning. Also the motor or engine 34 continually rotates the shaft 35 while functioning.

Shaft 35 is connected through clutch 36 to a sprocket wheel 37 and said sprocket wheel accommodates a chain 38 which passes over a comparatively large sprocket wheel 39. Sprocket wheel 39 is rigidly secured to the drum 40 so as to rotate the same. Drum 40 is rigidly secured to the drive shaft 41 to which the winding drum 9 is rigidly secured. A brake belt 42 surrounds the drum 40 and is connected through an arm 43 and shaft 44 with a crank 45 to which one end of the pull rod 46 is secured. As shown in Fig. 2, pull rod 46 is pivotally connected with a lever 47 pivotally mounted at 48 on the rack 49. A spring-pressed catch 50 coacts with the rack 49 to lock the lever 47 in any desired adjusted position. When lever 47 is moved in one direction the brake band 42 is loosened and when moved in the opposite direction this brake band is tightened. Likewise the clutch 36 is actuated by a bell crank lever 51 which is controlled through the pull rod 52. When the rod 52 is moved in one direction clutch 36 is functioning and when moved in the opposite direction clutch 36 is disengaged.

When it is desired to wind cable 7, brake band 42 is loosened and clutch 36 is caused to function, whereupon power will be transmitted to the drum 6 while rotating the same in such a direction as to wind the cable. When it is desired to feed out this cable, brake band 42 is loosened more or less so as to allow the weight of the drills and other parts to cause the drum 9 to unwind the cable. After a sufficient amount has been payed out the brake band 42 is tightened and the catch 50 caused to engage in the proper notch in rack 46 to lock the parts against further movement. Clutch 29 is moved to a closed or open position by the control rod 53. It will be noted that all of the pull rods extend to the forward end of the machine so that they may be operated by anyone who is standing at the front of the machine. When the control rod 53 is rocked in one direction clutch 29 is functioning to cause the shaft 15 to rotate, and when moved in the opposite direction power is disconnected from shaft 15 even though pulley 30 and associated parts are still functioning.

During the ordinary drilling operation shaft 41 is stationary while shaft 15 is rotating whereby the drills are moved upwardly and downwardly. The distance of movement of the drills is regulated by the length of the cranks 18 and 19. It will also be noted that the drills are moved upwardly and downwardly positively by reason of the cranks just mentioned, and in addition the downward movement is augmented by the weight of the walking beams, spudding sheave and associated parts whereby a smooth uniform action is secured without the addition of any further weight.

It will be understood that any kind of an engine or motor may be used as motor 34, and when the motor is functioning shafts 33 and 35 will be continually rotating. From these two shafts power is taken off to operate the respective parts either simultaneously or at different times. The shaft 15 usually is functioning most of the time while shaft 41 is usually stationary most of the time and is only moved from time to time to change the position of the drilling tools.

I claim:

1. A drilling machine of the churn type comprising a frame, a derrick carried by said frame having a crown pulley, a pair of walking beams pivotally mounted at one end on said frame, a spudding shaft rotatably mounted on said walking beams adjacent the end opposite their pivotal mounting, a spudding sheave loosely mounted on said shaft, a crank rigidly secured to said shaft adjacent each end, a pitman pivotally carried at the outer end of each of said cranks, means for pivotally connecting the opposite ends of the respective pitmans to said frame, a drum for feeding a cable to said spudding sheave, said cable extending upwardly and over said crown sheave and then downwardly to the drilling tools of the machine, power means for causing said spudding shaft to rotate whereby said spudding sheave and walking beams will swing upwardly and downwardly, and means for rotating said drum in one direction to take up said cable, said means also functioning to permit said drum to rotate under the pull of said cable to pay out said cable.

2. A well drilling machine comprising a frame, a derrick provided with a crown sheave, a cable extending over said crown sheave, means for causing said cable to reciprocate, said means including a spudding sheave positioned near said frame, a spudding shaft extending loosely through said spudding sheave, a pair of walking beams pivotally mounted at one end, means for rotatably mounting said spudding shaft on said walking beams near the end opposite the pivotal mounting of the walking beams, a crank secured to said spudding shaft, a pitman pivotally connected to said crank at the outer end thereof, means for pivotally mounting the opposite end of said pitman in a fixed position, and means for causing said spudding shaft to rotate.

3. A well drilling machine comprising a frame, a derrick having a crown sheave, a spudding sheave, a cable extending beneath said spudding sheave and over said crown sheave, a spudding shaft carrying said spudding sheave, a walking beam structure rotatably supporting said spudding shaft, means for pivotally mounting one end of said walking beam structure, a sprocket wheel rigidly secured to said shaft, a power chain for rotating said shaft, a crank secured to said shaft, a pitman pivotally connected to the outer end of said crank, and a fixed journal pin extending through the end of said pitman opposite said crank whereby when said power chain functions the rotation of said shaft will cause said crank to act against said pitman to cause said spudding sheave to move up and down.

4. A well drilling machine including a walking beam structure, means for pivotally mounting one end of said walking beam structure, a shaft rotatably mounted on said walking beam structure adjacent the end opposite said pivotal mounting, a spudding sheave loosely mounted on said shaft, a crank secured to each end of said shaft, a pitman for each of said cranks, said pitmans respectively having one end supported by a fixed pivotal pin and the other end pivotally connected to the outer end of the cranks, a sprocket wheel rigidly secured to said shaft, a prime mover, means for connecting and disconnecting said prime mover with said sprocket so that the sprocket wheel may be rotated or stopped, a cable carried by said spudding sheave, and means for connecting and disconnecting said prime mover with said cable.

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