March 24, 1925.

1,530,727

G. KRELL

ENGINE STARTER

Filed July 17, 1922

3 Sheets-Sheet 1

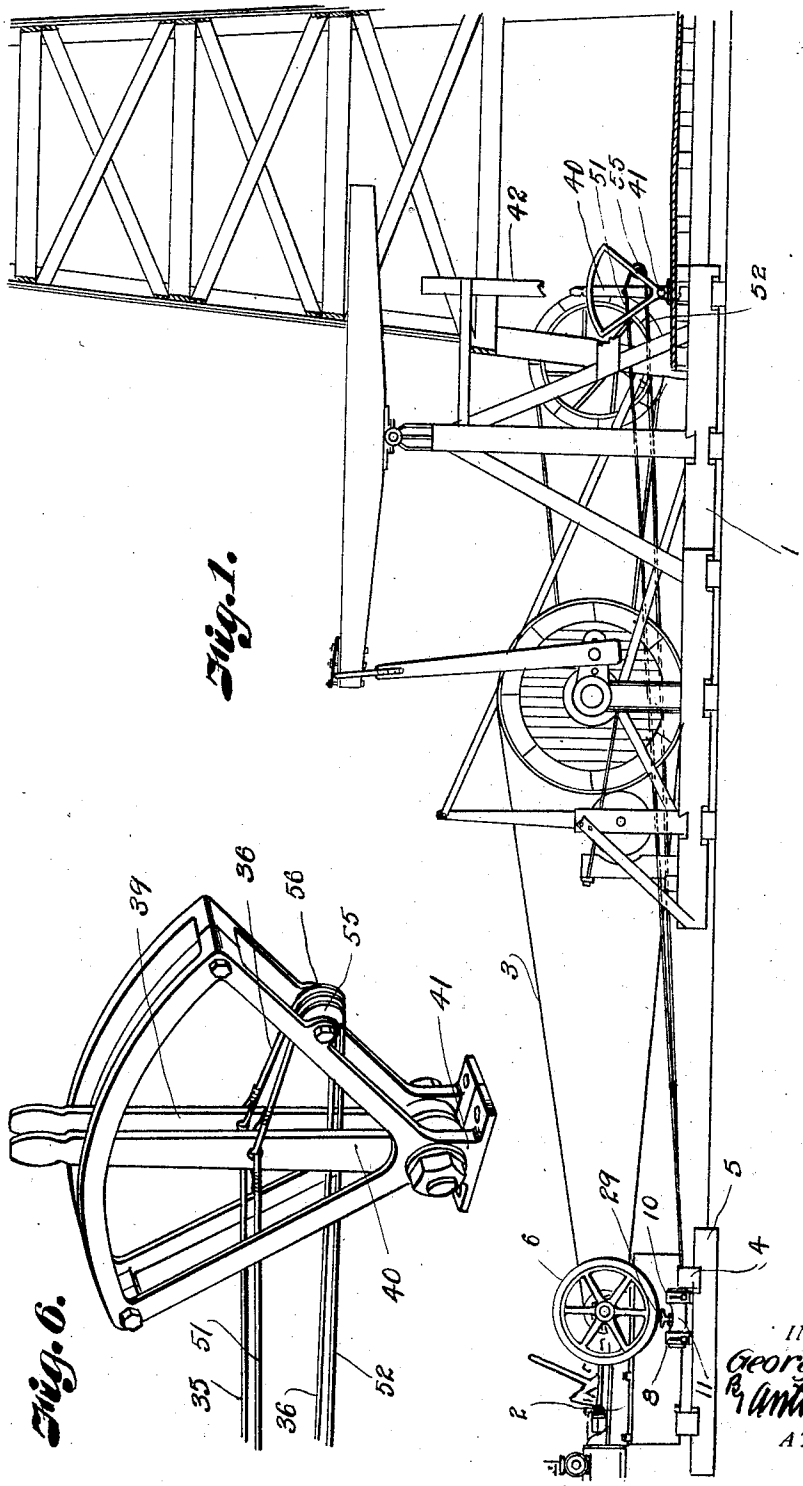


Fig. 1.

Fig. 6.

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Fig. 3.

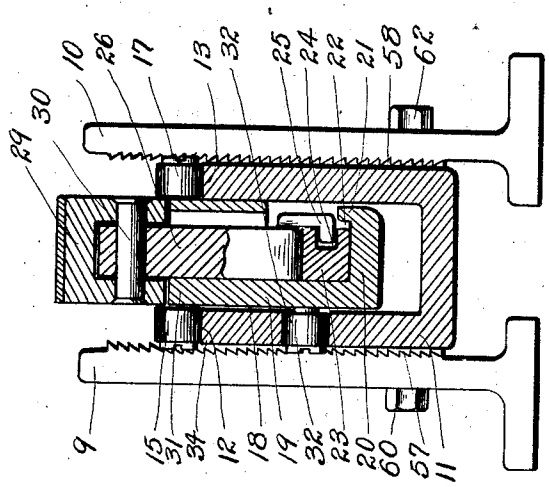
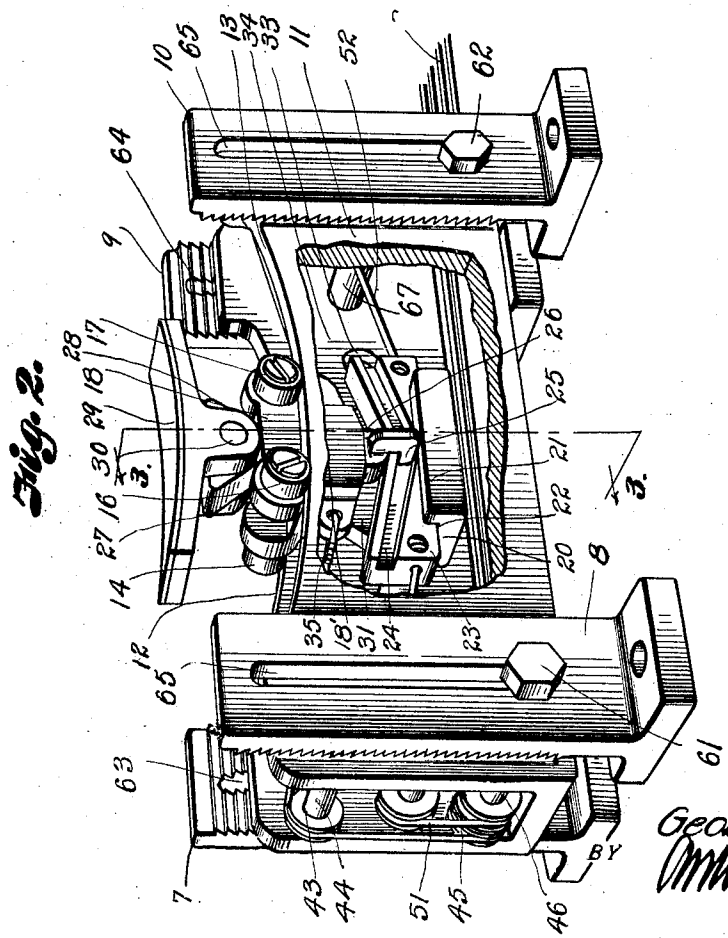


Fig. 2.



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Fig. 5.

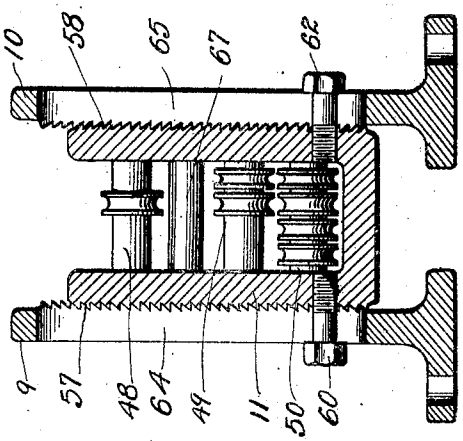
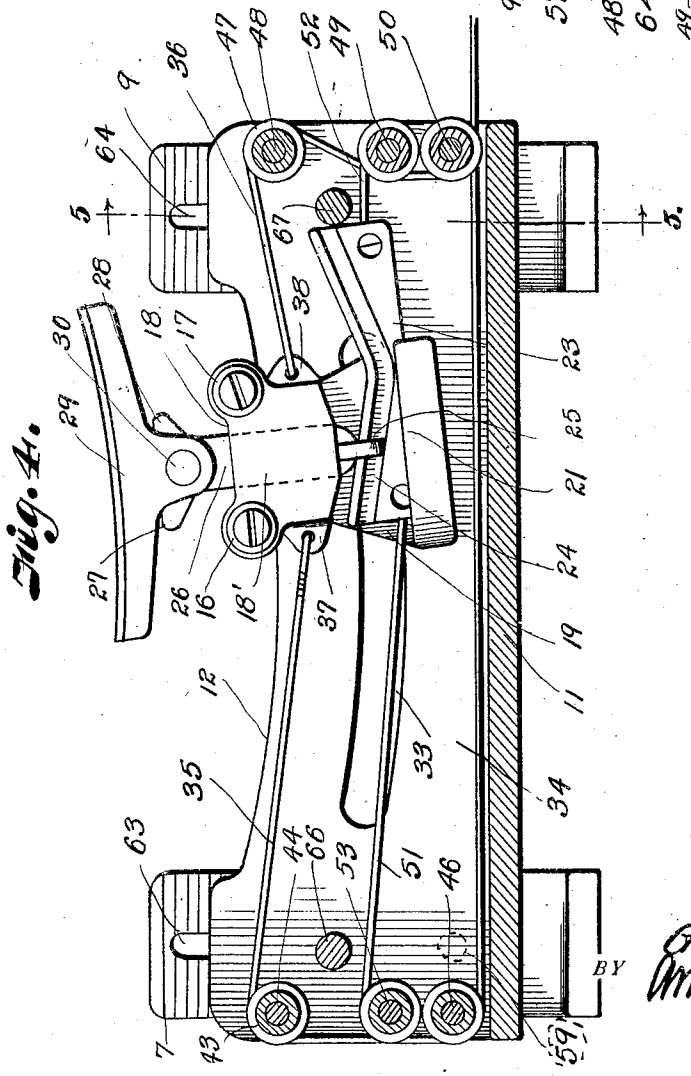


Fig. 4.



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Patented Mar. 24, 1925. 1,530,727

UNITED STATES PATENT OFFICE.

GEORGE KRELL, OF KANSAS CITY, MISSOURI.

ENGINE STARTER.

Application filed July 17, 1922. Serial No. 575,446.

To all whom it may concern:

Be it known that I, GEORGE KRELL, a citizen of Germany, residing at Kansas City, in the county of Jackson and State of Missouri, U. S. A., have invented certain new and useful Improvements in Engine Starters; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

This invention relates to a starter for drilling engines and it is particularly adapted for use in connection with oil well drilling engines.

Oil well drilling engines are usually single cylinder engines and not infrequently during the drilling operation, the engines are stopped on account of overload and most frequently the stopping occurs when the cranks are on dead center. The engines are usually situated some distance from the drilling derrick so it becomes necessary for the driller to leave the drilling apparatus and turn over the fly wheel of the engine so that the cranks will be off dead center to permit the engine to start.

Prior to my invention it was the practice to start the engine by placing the weight of the driller on one of the spokes of the fly wheel and exert whatever additional power could be exerted by the driller on the fly wheel so as to give a partial turn to the fly wheel to permit the engine to start. Under such conditions the engine throttle was obviously wide open so that when the driller turned with the fly wheel slightly, a rush of steam entered the cylinder of the engine, causing the engine to start at full speed or at practically full speed and, as a result, the driller was frequently caught in the fly wheel and if not killed, seriously injured.

My invention contemplates the provision of means whereby the engine can be started from a distant point, the point at which the means may be operated may be conveniently near the drilling rig so that whenever the engine stops on dead center, the driller can operate certain mechanism which will throw the fly wheel around to throw the cranks off dead center to permit the engine to start and thereby eliminate not only the loss of time consumed by the driller making a trip to and from the engine but also the liability of injury or possibly death due to being caught in the fly wheel.

The novel construction of the engine starter will be clearly understood by reference to the following description in connection with the accompanying drawings, in which—

Fig. 1 is a side elevational view of an oil well rig including the engine for operating it, the construction being shown more or less diagrammatically because the details of the engine rig and engine are immaterial.

Fig. 2 is a perspective view of the engine engaging mechanism for turning the fly wheel.

Fig. 3 is a cross sectional view on the line 3—3 of Fig. 2.

Fig. 4 is a longitudinal sectional view through the supporting member for the fly wheel engaging mechanism, the fly wheel engaging mechanism being shown in elevation.

Fig. 5 is a vertical cross sectional view on the line 5—5 of Fig. 4, and

Fig. 6 is a detail perspective view of the manually controlled levers for throwing the fly wheel engaging mechanism into and out of fly wheel engaging position.

Referring now to the drawings by numerals of reference:

1 designates a conventional type of oil well rig which may be operated from the drilling engine 2 through a belt 3 in the usual way. The engine, of course, is supported upon pony sills 4 crosswise of the mud sills 5. The engine is provided with a fly wheel 6, which is the part of the engine to be engaged by my invention in order to turn the crank shaft so that the cranks will be thrown off dead center. Therefore, I prefer to locate the supports or standards upon the mud sills.

I prefer to apply four standards 7, 8, 9

and 10 to the mud sills and utilize these for supporting a block or bracket 11, U-shaped in cross section, the free upper side edges 12 and 13 of which are curved on an arc to receive the rollers 14, 15, 16 and 17 of a longitudinally movable carriage 18, which may be hung upon the arcuate edges of the U-shaped bracket, as will be apparent by reference to Figs. 2, 3 and 4. The carriage has a depending step or supporting member 19 extending from the upper body portion thereof and the step includes a transverse floor 20 with a longitudinal edge flange 21, thereby providing a guide groove 22 in which is longitudinally slidable a cam bar 23 having a substantially V-shaped cam groove 24 therein, the deepest portion of which is approximately at the middle of the bar. The angles of the two wings of the V, however, are considerably wider than a true V, the purpose being to cause the cam groove to provide oppositely disposed, upwardly inclined riding faces for a hook-shaped portion 25 of a vertically slidable bar 26 which is carried by the upper portion of the carriage 18. The upper portion of the carriage 18 is shown as constituting a block 18', having a longitudinal slot within which the bar 26 may ride. The bar 26 has at its upper end two oppositely disposed wings 27 and 28 which constitute stops for the shoe 29, pivoted at 30 to the bar. The stops allow the shoe 29 to have only a limited rocking movement so that the shoe 29 will remain in substantially the position shown in Figs. 2 and 4 under all conditions.

The depending wall 31 of the carriage carries a roller 32, which rides in the arcuate slot 33 in the wall 34 of the bracket 11, the curvature of the slot 33 conforming to the curvature of the upper edges 12 and 13 of the U-shaped bracket, the longitudinal movement of the carriage being limited only by the length of the slot 33.

The carriage may have movement longitudinally of the U-shaped bracket through the medium of cables 35 and 36 fastened to the ears 37 and 38 on the block 18' and fastened to the lever 39 pivoted to the stand 41, which may be fastened to the floor of the well drill rig preferably adjacent to the headache post 42. The stand 41 constitutes a fan-shaped frame within which lever 39 is confined. The cable 35 passes around a pulley 43 on shaft 44 in the U-shaped bracket 11 and around a pulley 45 on the shaft 46, carried by the U-shaped bracket, thence along the floor of the U-shaped bracket to the lever 39. The cable 36 passes around a pulley 47 on shaft 48 carried by the U-shaped bracket 11 and over pulleys on shafts 49 and 50 and thence over pulley 56 to lever 39.

The cam bar 23 has its ends connected to cables 51 and 52. The cable 51 passes around pulleys on shafts 53 and 46 and thence along the floor of the bracket to the lever 40 adjacent to the lever 39 on the stand 41. The cable 52 passes over pulleys on shafts 49 and 50 and over a pulley 55 on stand 41 and is finally fastened to the lever 40.

When the lever 40 is shifted away from the operator, that is, in a contra-clockwise direction, tension will be put on the cable 52 and the cable 51 will be slacked so that the bar 23 will be shifted to ride the cam groove over the hook 25 of the bar 26, causing the bar 26 to raise the shoe 29 into engagement with the fly wheel of the engine. A continued swinging movement of the lever 40 in a contra-clockwise direction will result in the carriage 18 being shifted longitudinally and since the shoe is in frictional engagement with the fly wheel, the fly wheel will be rotated enough to throw the cranks off dead center. The longitudinal movement of the bar 23 is limited in one direction by the stop 66 and in the other direction by the stop 67. In Fig. 4 it is shown against 67, the shoe being in the position it will have assumed when the fly wheel has been turned far enough to throw the crank or cranks off dead center so that the engine may be operated.

When it is desired to move the parts back to dead center, both levers 39 and 40 will be shifted to neutral position, as shown in Fig. 6, when the carriage as well as the bar 23 will be in the center of the U-shaped bracket or, in other words, will be shifted in inoperative position with the hook in the lowest part of the groove 24 so that the shoe will be away from the wheel.

In order to provide for different sized fly wheels and in order that a proper vertical adjustment of the bracket carrying the movable parts of the fly wheel engaging mechanism can be had, I prefer to serrate or roughen the inner faces of the several standards or posts 7, 8, 9 and 10 so as to receive the toothed portions 57 and 58 on the outer faces of the two parallel side walls of the U-shaped bracket, the standards being adapted to be clamped to the side walls by the bolts 59, 60, 61 and 62, which are received in the longitudinal slots 63, 64, 65 and 66 of said posts. Therefore, by unscrewing the screws 59, 60, 61 and 62, the U-shaped bracket can be raised or lowered to proper position and secured in place by again screwing up the bolts which have threaded ends to engage the walls of the U-shaped bracket 11.

It will be apparent that the mechanism above described permits absolute control of the engine is so far as assisting it over dead center is concerned from a point distant from the engine so that the driller may turn the fly wheel of the engine without consuming the time of making the trip from the drill rig to the engine and he may also do it in absolute safety. therefore eliminat-

ing the practice, if not the necessity, of risking life and limb as has been considered the practice heretofore.

What I claim and desire to secure by Letters-Patent is:

1. An engine starter comprising a bracket, a longitudinally movable carriage on said bracket, a fly wheel engaging shoe having vertical movement in the carriage, a longitudinally shiftable cam for imparting movement to said shoe to force it into engagement with the fly wheel, and means for shifting the carriage to cause the shoe to turn the fly wheel by frictional contact therewith when the carriage is shifted.

2. An engine starter comprising a U-shaped bracket, supports for the bracket, means for vertically adjusting the bracket in the supports, a longitudinally shiftable carriage carried by the bracket, a shoe for engaging the fly wheel, a support for the shoe vertically adjustable in the carriage, a cam for causing vertical adjustment of the shoe, operating connections for the cam, and separate operating connections for the carriage.

3. An engine starter comprising a bracket having a slot therein, a carriage, rollers on the carriage to ride on the upper edge of the bracket, a roller carried by the carriage and movable in the slot, a vertically movable shoe carried by the carriage, a cam for raising and lowering the shoe so as to move it into and out of engine-fly-wheel-engaging position, means distant from the cam and carriage for operating them, and connections between the operating means and the carriage and the cam.

4. An engine starter comprising a U-shaped bracket having parallel side walls, with curved upper edges, one of the side walls being provided with a slot, a carriage suspended from the upper edges of the side walls, a roller on the carriage in the slot, means carried by the carriage for engagement with an engine fly wheel, and means for rendering the engine-fly-wheel-engaging means effective and ineffective.

5. An engine starter comprising a U-shaped bracket having parallel side walls with curved upper edges, one of the side walls being provided with a slot, a carriage suspended from the upper edges of the side walls, a roller on the carriage engaging the slot, means carried by the carriage for engagement with an engine fly wheel, and means for rendering the engine-fly-wheel-engaging means effective and ineffective, said means comprising a cam bar having sliding movement whereby in one position the engine-fly-wheel-engaging means will be permitted to gravitate away from the fly wheel and whereby when the bar is in another position, the fly-wheel-engaging means will move into engagement with the periphery of the fly wheel.

6. An engine starter comprising a carriage support, a longitudinally shiftable carriage in said support, a longitudinally shiftable cam bar carried by the carriage, a vertically movable bar actuated by the cam bar, and a shoe carried by the vertically movable bar.

7. An engine starter comprising a vertically adjustable bracket frame, a carriage mounted upon said frame for longitudinal movement, a vertically movable bar carried by the carriage, a shoe at the upper end of the bar, a cam carried by the carriage and having longitudinal movement for raising and lowering said bar, means for shifting the carriage longitudinally of the bracket frame, and means for shifting the cam longitudinally of the bracket frame and across the carriage.

8. An engine starter comprising a vertically adjustable bracket frame, a carriage movable on said bracket frame in an arc of a circle, a bar vertically movable in said carriage, a shoe on the bar, and means for raising and lowering the bar.

9. An engine starter comprising a bracket frame, a carriage longitudinally movable on said frame and having a depending grooved portion, a cam bar slidably receivable in said grooved portion, a vertically movable bar in engagement with the cam bar, a shoe on the vertically movable bar, means for shifting the carriage on the bracket, and means for shifting the cam bar with respect to the carriage.

10. An engine starter comprising a support, a longitudinally movable carriage on said support, a vertically movable bar carried by the carriage, a shoe carried by one end of the bar, means engaging the other end of the bar to shift it vertically with respect to the carriage, rollers carried by the support, flexible connections secured to the carriage and passing around the rollers, and flexible cables connected to the bar shifting means and passing around said rollers.

11. An engine starter comprising a support having parallel side walls with arcuate upper edges, a carriage between the side walls having rollers engaging the edges, the carriage being movable longitudinally of the support, means for imparting movement to the carriage longitudinally of the support, a bar carried by the carriage, a shoe connected to the top of the bar, and means carried by the carriage for vertically moving the bar.

12. An engine starter comprising a support having parallel side walls with arcuate upper edges, a carriage between the side walls having rollers engaging the edges, the carriage being movable longitudinally of the support, means for imparting movement to the carriage longitudinally of the support, a bar carried by the carriage, a

shoe connected to the top of the bar, and means carried by the carriage for vertically moving the bar, said means comprising a bar shiftable on the carriage and having a V-shaped groove to engage a projecting part on the bar.

13. An engine starter comprising a bracket having a vertical wall provided with an arcuate upper edge, a carriage, means for suspending the carriage from the arcuate edge of the wall, a vertical bar carried by the carriage, a shiftable cam bar carried by the carriage for raising and lowering the bar, stops on the vertical wall for limiting the movement of the cam bar, and a fly wheel-engaging shoe carried by the vertical bar.

In testimony whereof I affix my signature.

GEORGE KRELL.