

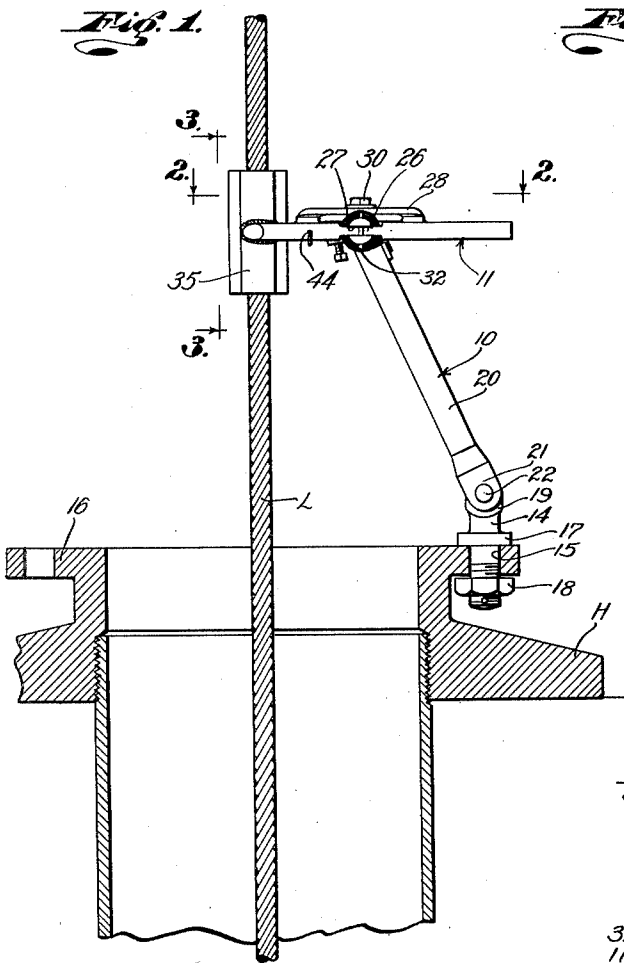
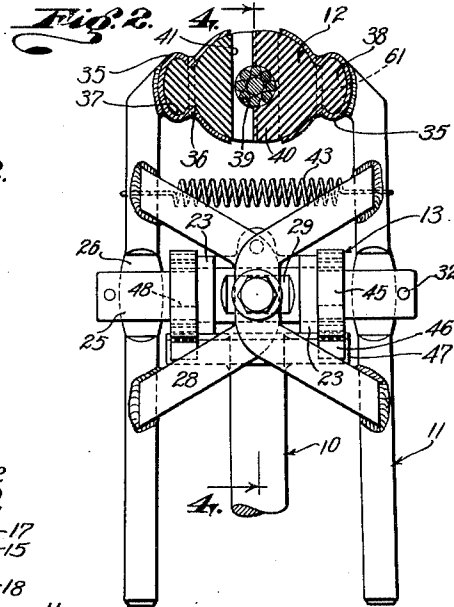
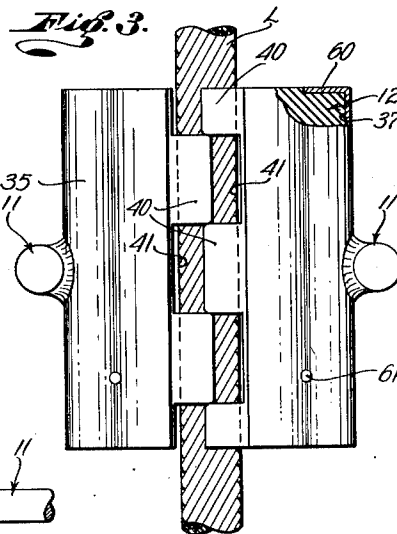
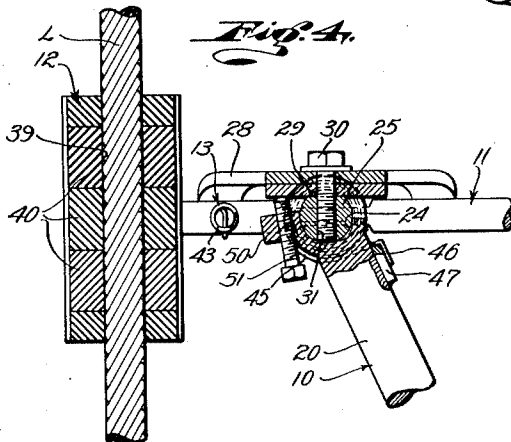
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LINE CLEANING DEVICE

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LINE CLEANING DEVICE

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This invention relates to a well tool and relates more particularly to a tool for cleaning lines and other objects run into and out of wells. A general object of this invention is to provide a practical and particularly effective device for wiping or cleaning cable, and the like, as it is pulled from the well.

In performing various operations in wells, lines or cables are employed to lower and operate the tools. For example, in bailing a well the bailer is operated on the lower end of a cable or line. When the bailer is pulled or withdrawn from the well the line is usually covered with mud, oil, water, etc. which falls on the operators, the derrick floor, and the equipment in the derrick.

Another object of this invention is to provide a device attachable to the casing head or any other convenient support at the head of the well to be immediately available for cleaning or wiping off the cable or line when the latter is pulled from the well.

Another object of this invention is to provide a device of the character mentioned that is easily and quickly moved from a retracted position clear of the mouth of the well to an active position where it is readily engageable about the line.

Another object of this invention is to provide a line wiping device embodying novel long-wearing wiping elements for contacting or cleaning the line.

Another object of this invention is to provide a line cleaning device of the character mentioned in which the wiping elements are formed and arranged to automatically compensate for the wear resulting from their contact with the moving line. The line wiping elements of the device are constructed so that they may be shifted one toward the other as the wear progresses, and means is provided for urging or feeding the elements in this manner to compensate for the wear.

Another object of this invention is to provide a line wiping device of the character mentioned in which the line wiping elements completely surround the line to effectively clean the same so long as the elements remain operative.

Another object of this invention is to provide a line wiping device that is adjustable to be suitable for use on casing heads of different sizes.

A further object of this invention is to provide a line wiping device of the character mentioned embodying a novel means for maintaining the wiping elements in correct position for engagement with the line.

The various objects and features of my invention will be fully understood from the following detailed description of a typical preferred form and application of the invention, throughout which description reference is made to the accompanying drawing, in which:

Fig. 1 is a side elevation of the tool or device of the present invention in its operative position on a well casing head, illustrating the head and a portion of the casing in vertical cross section. Fig. 2 is an enlarged horizontal detailed sectional view taken as indicated by line 2—2 on Fig. 1. Fig. 3 is an enlarged front view of the wiping elements and their carriers being a view taken as indicated by line 3—3 on Fig. 1. Fig. 4 is a fragmentary vertical detailed sectional view taken as indicated by line 4—4 on Fig. 2.

The improved line cleaning or line wiping device of the present invention may be said to comprise, generally, adjustable supporting means adapted to be secured to a casing head H, a pair of levers 11 mounted on the supporting means 10, wiping elements 12 on the levers 11 for cleaning or wiping the line L and means 13 acting on the levers 11 to maintain the wiping elements 12 in correct cooperation with the line L.

The supporting means 10 is adapted to be secured to a casing head flange or other convenient object at the mouth of the well and serves to support the levers 11 and the other parts of the device. In accordance with the invention the means 10 is such that it supports the levers 11, etc., for movement between retracted positions fully clear of the well mouth and active positions where the elements 12 may engage about the line L. The means 10 includes a stud or post 14 adapted to be arranged in a stud hole in a casing head flange, or the like. In the drawing the post 14 passes through a stud opening 15 in the flange 16 of the casing head H. An enlargement or collar 17 is provided on the post 14 to bear against the upper side of the flange 16 and a nut 18 is threaded on the lower end of the post 14. The nut 18 is suitably keyed against displacement and has suitable clearance with the flange 16 to allow free turning of the post 14 in the opening 15. The upper portion of the post 14 is flattened to form a substantially vertical tongue 19.

The supporting means 10 further includes an arm 20 pivoted to the post 14. A yoke 21 on the lower end of the arm 20 receives the tongue 19 of the post 14. A pivot pin 22 is arranged through transverse openings in the tongue 19 and the yoke 21 to connect the arm 20 with the post 14 for pivotal movement about a generally

horizontal axis. The axis of pivotal movement of the arm 20 is substantially horizontal and is tangent to a circle concentric with the vertical axis of the well so that the arm 20 may be swung or pivoted between the upwardly and inwardly inclined active position illustrated and a retracted position where it reclines on the derrick floor or slopes upwardly and outwardly away from the mouth of the well. The upper end of the supporting arm 20 is yoked to have spaced tubular bosses or bearings 23. The openings of the bearings 23 are horizontal and substantially parallel with the axis of the pivot pin 22. The yoke portion of the arm 20 connecting the bearings 23 has an upwardly facing groove or cradle 24 forming a continuation of the openings in the bearings 23. The supporting means 10 further includes a trunnion or shaft 25 turnably supported in the bearings 23 and the cradle 24. The shaft 25 is sufficiently long to project horizontally beyond the spaced bearings 23.

The levers 11 carry the wiping elements 12 and are supported on the upper end of the arm 20 through the medium of the shaft 25 and other supporting elements. The levers 11 are alike or complementary and are normally spaced apart in generally parallel relation. As best illustrated in Figs. 1 and 2, the levers 11 are arranged in transverse relation to the shaft 25 and are generally horizontal when the device is in the operative position. Each lever 11 has a flattened part 26 between its ends received in a slot 27 in an end of the shaft 25. Keys 32 are passed through openings in the end parts of the shaft 25 to prevent displacement of the parts 26 from the slots 27. The cooperation of the parts 26 with the slots 27 maintains the levers 11 in a common plane and stabilizes the levers. Each lever 11 carries a strap or bracket 28. The brackets 28 are substantially V-shaped or U-shaped in plan view and the ends of their spaced arms or parts are welded to the levers. The brackets 28 of the two levers 11 project toward one another in overlying relation to the shaft 25, the bearings 23, etc. The central portions of the U-shaped brackets 28 overlap or engage one upon the other above the exposed portion of the shaft 25 between the bearings 23. The shaft 25 may have a flat upper surface 29 and the lowermost bracket 28 may shiftably bear on this surface. A pivot pin 30 passes through openings in the overlapping portions of the brackets 28 and threads into an opening 31 in the shaft 25. The pin 30 connects the two levers 11 for relative pivoting about a generally vertical axis assuming the device to be in its operative position and pivotally secures the brackets 28 of the levers 11 to the shaft 25 so that the levers may bodily pivot about the longitudinal axis of the shaft 25. The inner ends or arms of the levers 11 are provided with means to receive the wiping elements 12 while the outer arms of the levers 11 form handles for operating or pivoting the levers. The wiping elements 12 are the active parts of the tool for engaging about the line L to remove or wipe mud, water, oil, etc., therefrom as the line is pulled from the well. The construction and operation of the elements 12 are features of the invention. A cage or carrier 35 is provided on the inner end of each lever 11 to contain a wiping element 12. The carriers 35 are alike or complementary and are welded or otherwise secured to the inner sides of the levers 11 to oppose one another.

The carriers 35 have open inner sides and

open upper and lower ends. In the preferred construction the carriers 35 are shaped to effectively retain the wiping elements 12. The outer portions of the carriers 35 are reduced in width while the inner portions of the carriers flare to their mouths. This construction provides the carriers 35 with pairs of opposed internal ribs 36 and substantially dove-tailed channels 37 behind the ribs. End walls 60 preferably close the upper ends of the channels 37.

The wiping elements 12 are formed of rubber, rubber composition, synthetic rubber, or the like, and are arranged or secured in the carriers 35 to surround or engage about the line L when the levers 11 are in their operative positions. In the preferred construction there is a single element 12 in each carrier 35. The elements 12 are integral blocks or members firmly secured in their respective carriers 35. The elements 12 are shaped to conform to the carriers 35 having enlarged inner portions and reduced vertically extending dove-tailed ribs 38 cooperating with the channels 37 to be securely locked in place. The wiping elements 12 may be cemented, vulcanized, or otherwise fixed in their carriers 35. Keys 61 may be arranged through transverse openings in the carriers 35 and elements 12 to assist in retaining the elements. Opposing or registering vertical grooves 39 are provided in the inner faces of the elements 12 for receiving or passing the line L. The engagement of the moving line L with the grooves 39 in the resilient wiping elements 12 removes or wipes the mud, oil, water, etc. from the line.

In accordance with the invention the opposing or engaging inner sides of the elements 12 are of special design whereby the elements may automatically compensate for the wear resulting from the movement of the line L through the grooves 39. The opposing inner sides of the elements 12 are formed to have mating or meshing cooperation. As best illustrated in Figs. 3 and 4 of the drawing the inner sides of the elements 12 have sets of alternate teeth 40 and notches 41. The teeth 40 and notches 41 of the two elements 12 are staggered to mesh, that is, the teeth 40 of one element oppose the notches 41 of the other element. The inner edges of the carriers 35 are behind and clear of the notched and toothed edges of the wiping elements 12. This construction is clearly shown in Fig. 3. In accordance with the invention the wiping elements 12 are initially proportioned and related so that the teeth 40 have only slight meshing cooperation with the grooves 41. The teeth 40 and notches 41 are of substantial depth to make the elements 12 long wearing. As the wear of the elements 12 at the grooves 39 progresses the extent of meshing engagement of the teeth 40 with the notches 41 increases. The mating teeth 40 and notches 41 allow the wiping elements 12 to automatically compensate for or take up their wear, thus prolonging the effective life of the elements. The meshing or overlapping engagement of the teeth 40 with the notches 41 is such that the elements 12 completely surround or enclose the line L so long as they remain active.

The means 13 acts on the levers 11 to urge the elements 12 toward one another so that the elements are maintained in effective wiping engagement with the line L and operates to urge the assembly of the levers 11, etc. to pivot on the shaft 25 to assure the most effective action of the wiping elements 12. The means 13 includes an extensible helical spring 43 connected

between the inner arms of the levers 11. The end portions of the spring 43 may be wrapped about the levers 11 and secured in openings 44 in the levers. The spring 43 is under tension and urges the inner arms of the levers 11 inwardly or toward one another so that the wiping elements 12 are held together about the line L.

The means 13 further includes torsional springs 45 acting on the assembly of the levers, etc. and urging the assembly to pivot about the axis of the shaft 25. The springs 45 are arranged around the exposed portions of the shaft 25 at the outer sides of the bearings 23. End parts 46 are provided on the springs 45 and bear against a stop 47 on the supporting arm 10. The other end parts of the torsional springs 45 are secured in transverse openings 48 in the shaft 25. The springs 45 bearing on the stop 47 and acting on the shaft 25 tend to pivot the shaft and the parts carried thereby to urge the wiping elements 12 downwardly on the cable or line L. The springs 45 thus serve to resist the tendency of the elements 12 to move upwardly with the upward travel of the line L and serve to maintain the wiping elements 12 in their correct generally vertical positions.

It is preferred to provide stop means for limiting the downward pivoting of the levers 11, elements 12, etc. This stop means may comprise a lug 50 projecting from the yoked upper portion of the supporting arm 20 and a stop screw 51 threaded upwardly through the lug. The lower side of the lowermost bracket 28 is engageable with the upper end of the screw 51 to limit the downward pivoting of the levers 11 and the elements 12. The screw 51 thus serves to limit pivoting of the parts by the spring 45. When the device is employed on casing heads varying in diameter the slope or angle of the supporting arm 20 of course varies and it may be necessary to adjust the stop screw 51 to maintain the correct angular relation between the levers 11 and the arm 20 so that the elements 12 are substantially vertical when engaged about the line L.

In the use or operation of the device of the present invention the post 14 may be employed to attach the arm 20 to the flange 16 of the casing head H. When the device is not in use the arm 20 may be swung downwardly and outwardly to a position where all parts of the device are clear of the mouth of the head H and in practice the arm 20 may be swung to a position where the outer parts of the device rest on the derrick floor. When it is desired to put the device into use the arm 20 is swung to the position illustrated in the drawing and the levers 11 are pivoted to spread or open the elements 12 so that the elements may engage about the line L. The outer arms of the levers 11 form convenient handles for opening the wiping elements 12. When the wiping elements 12 are engaged about the line L the levers 11 are released by the operator and the spring 43 urges the wiping elements together to correctly engage the line L. The device is then in condition for operation.

As the line L moves upwardly the soft resilient wiping elements 12 effectively remove or wipe the liquid, mud, oil, etc. from the line so that this material falls back into the well. The wiping elements 12 supported in the manner described above are free to adapt themselves to all variations in the position of the line L. The supporting arm 20 is, of course, free to

pivot on the pivot pin 22, the post 14 is free to pivot in the opening 15, the assembly of the levers 11 and members 12 is free to rock on the axis of the shaft 25 and the levers 11 may pivot about the pin 30. These various adjustments or points of pivoting and rocking allow the wiping elements 12 to freely move with the line L in the event the latter shifts or moves as it is pulled upwardly. As described above, the meshing teeth 40 and notches 41 allow the wiping elements 12 to take up under the action of the spring 43 and thus compensate for the wear of the elements at their grooves 39. When it is desired to free the device from the line L the outer arms of the levers 11 are engaged and moved toward one another to pivot the wiping elements 12 away from the line L. When the elements 12 are free of the line L the supporting arm 20 may be swung to its retracted or inactive position.

Having described only a typical preferred form 20 and application of my invention, I do not wish to be limited or restricted to the specific details herein set forth, but wish to reserve to myself any variations or modifications that may appear to those skilled in the art or fall within the scope of the following claims.

Having described my invention, I claim:

1. A device for application to a well head operable to wipe a line extending through the well head comprising a pair of pivoted levers, opposing wiping elements on the levers engaged about and released from the line upon pivoting of the levers, and means attachable to the well head supporting the levers above the head for swinging movement about a substantially horizontal axis toward and away from the vertical axis of the well, and for pivotal movement about a substantially vertical axis.

2. A device for application to a well head operable to wipe a line extending from the well comprising a supporting arm, means pivotally mounting the arm on the head for pivotal movement about a substantially horizontal axis so that the arm may move toward and away from the line, a pair of horizontally spaced levers, means on the upper end of the arm supporting the levers relative pivotal movement and for oscillation about a generally horizontal axis, and wiping elements on the levers engaged about and freed from the line upon relative pivoting of the levers.

3. A device for application to a well head operable to wipe a line extending from the well comprising a supporting arm, means mounting the lower end of the arm on the head for pivotal movement about a substantially horizontal axis so that the arm may be swung toward and away from the line, a pair of horizontally spaced levers, means mounting the levers on the arm for relative pivotal movement and for oscillation about a generally horizontal axis, wiping elements on the inner parts of the levers for engaging about the line, means yieldingly urging the inner parts of the levers toward one another so that the wiping elements are maintained in co-operation with the line, and means yieldingly urging the levers to pivot about said horizontal axis.

4. A device for application to a well head operable to wipe a line extending from the well comprising a supporting arm, means securing the lower part of the arm to the head to swing on a substantially horizontal axis between a retracted position and an active position where it projects upwardly and inwardly toward the line, a pair of spaced levers, means mounting the levers on the

upper part of the arm for relative pivotal movement about a substantially vertical axis and for simultaneously rocking about a substantially horizontal axis, wiping elements on the inner arms
 5 of the levers for engaging about the line, and yielding means urging the levers to pivot about said horizontal axis so that the wiping elements are urged downwardly on the line.

5. A device to be applied to a well head to
 10 clean an object pulled from the well comprising a supporting arm, means securing the lower end of the arm to the head to pivot about a substantially horizontal axis from a retracted position to an active position where it slopes upwardly and
 15 inwardly toward said object, a shaft supported on the upper end of the arm for movement about an axis substantially parallel with the first mentioned axis, wiping means for engaging the object supported by said shaft, and yielding means urging the wiping means to swing downwardly.

6. A device to be applied to a well head to
 clean an object pulled from the well comprising a supporting arm, means securing the lower end
 25 of the arm to the head to pivot about a substantially horizontal axis from a retracted position to an active position where it slopes upwardly and inwardly toward said object, a shaft supported on the upper end of the arm for movement about
 30 an axis substantially parallel with the first mentioned axis, wiping means for engaging the object supported by said shaft, levers carrying the wiping means, means pivoting the levers to the shaft, and spring means acting on the levers to maintain the wiping means in cooperation with
 35 the object.

7. A device to be applied to a well head to
 clean an object pulled from the well comprising a supporting arm, means securing the lower end
 40 of the arm to the head to pivot about a substantially horizontal axis from a retracted position to an active position where it slopes upwardly and inwardly toward said object, a shaft supported on the upper end of the arm for movement about an axis substantially parallel with the first
 45 mentioned axis, wiping means for engaging the object, the wiping means comprising opposing wiping elements, levers carrying the wiping ele-

ments, and a pivot pin on the shaft connecting the levers for relative pivotal movement and for pivoting about a substantially vertical axis.

8. A device for application to a well head operable to wipe a line extending from the well
 5 comprising a pair of pivoted levers, opposing wiping elements on the levers engaged about and released from the line upon pivoting of the levers, the wiping elements having grooves in their opposing sides for cooperating with the line, mesh-
 10 ing teeth on the said opposing sides having only partial meshing engagement when the grooves cooperate with the line whereby wear at the grooves may be compensated for by increasing
 15 the said meshing engagement, means acting on the levers to urge the wiping elements together to increase the meshing engagement of the teeth, a supporting arm, means mounting the levers on the arm for relative pivotal movement about a
 20 vertical axis and for oscillation about a substantially horizontal axis, and means attachable to the well head supporting the arm for swinging movement about a substantially horizontal axis toward and away from the vertical axis of the
 25 well.

9. A device to be applied to a well head to
 clean an object pulled from the well comprising a supporting arm, means securing the lower end
 30 of the arm to the head to pivot about a substantially horizontal axis from a retracted position to an active position where it slopes upwardly and inwardly toward said object, a shaft supported on the upper end of the arm for movement about an axis substantially parallel with the first mentioned axis, wiping means for engaging the ob-
 35 ject, the wiping means comprising levers, carriers on the levers, wiping elements in the carriers having opposed sides provided with grooves for cooperating with the line, teeth on said sides having partial meshing engagement when the
 40 grooves receive the line whereby wear at the grooves may be compensated for by increasing the meshing engagement of the teeth, levers pivoted to the shaft, and means urging the levers together to increase said meshing engagement.
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