Sept. 20, 1955 A. K. BAEBEL 2,718,021

OIL WELL PIPE AND DRILL STEM WIPER

Filed Aug. 14, 1953 2 Sheets-Sheet 1

Fig 1

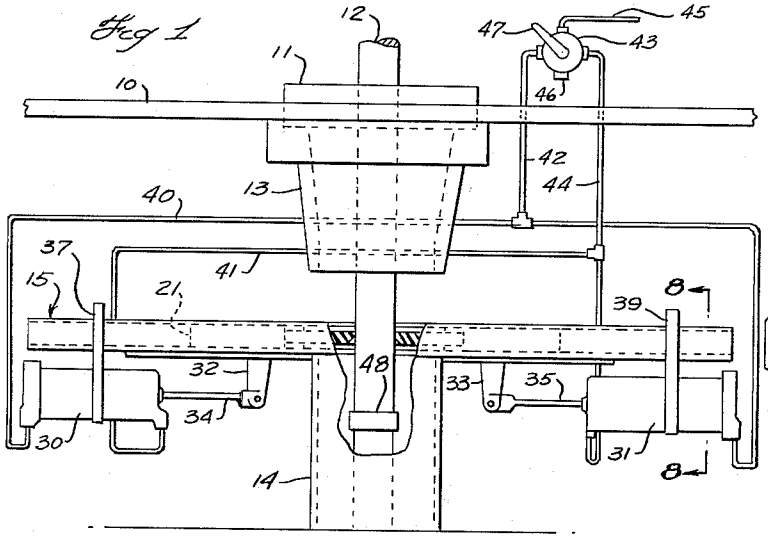
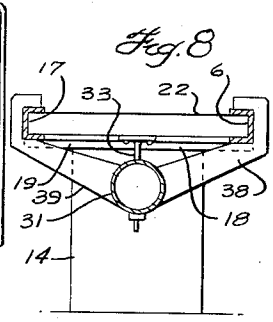


Fig. 8



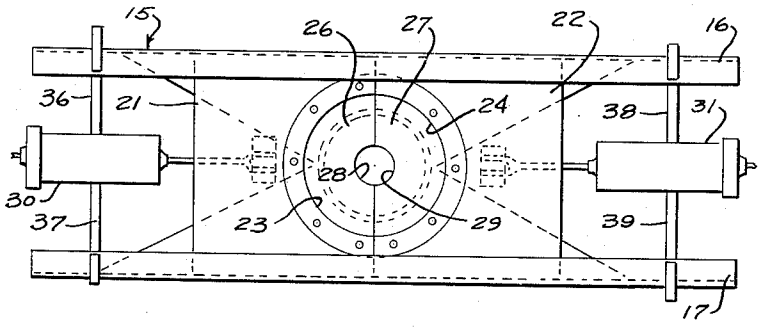


Fig 2

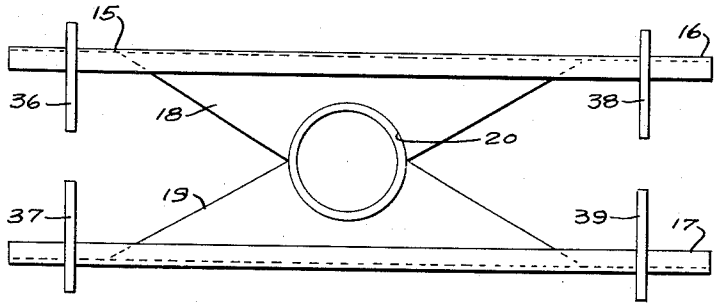


Fig. 3

INVENTOR
ARTHUR K. BAEBEL

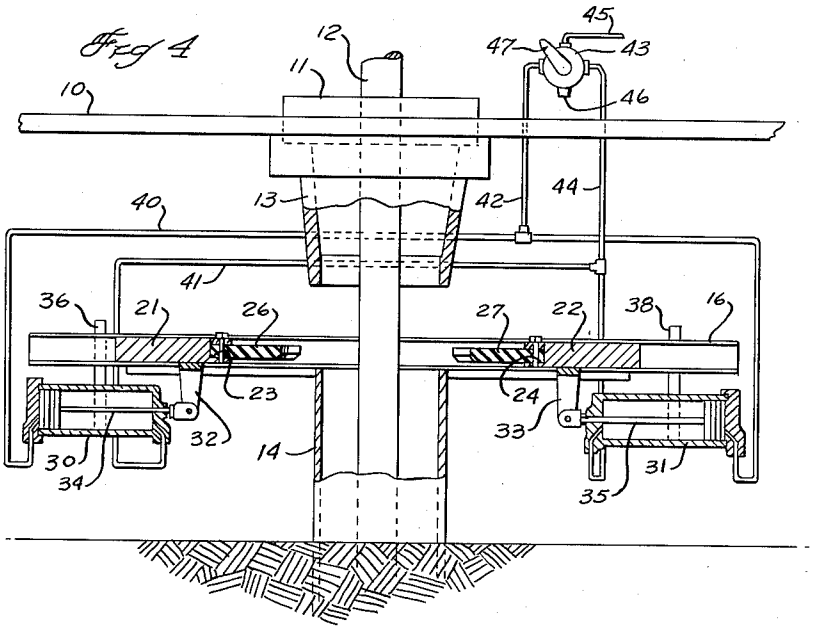
BY
McMorrow, Berman & Davidson
ATTORNEYS

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Fig. 4



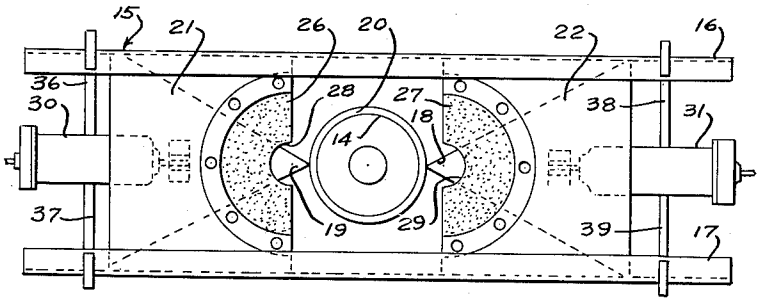


Fig. 5

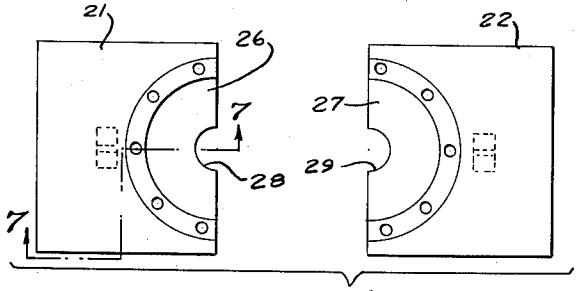


Fig. 6

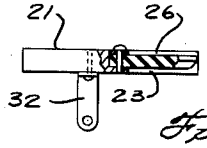


Fig. 7

INVENTOR

ARTHUR K. BAEBEL

BY

McMorrow, Berman & Davidson

ATTORNEYS

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2,718,021

OIL WELL PIPE AND DRILL STEM WIPER

Arthur K. Baebel, Maracaibo, Venezuela

Application August 14, 1953, Serial No. 374,188
2 Claims. (Cl. 15—102)

This invention relates to wipers for wiping drilling mud, water and oil from oil well pipes or drill stems as the pipes or drill stems are withdrawn from the well and more particularly to a wiper assembly which can be opened and closed to permit the passage of large diameter parts, such as drill bits, through the wiper, without damage to the wiper parts.

It is among the objects of the invention to provide an improved wiper assembly which can be permanently mounted on the well rig structure, as on the top end of the surface casing above the blow out preventer or suspended from the drill platform, the rotary table or the flow nipple; which can be opened and closed under manual control to permit the passage of drill bits or other structures, such as finishing tools or pumps of large diameter through the wiper without damage to the wiper parts; which is resiliently closed and will give sufficiently in an opening direction to provide for the passage of pipe or drill stem joints or couplings through the wiper without damage or excessive wear of the rubber wiping elements of the wiper assembly; which will effectively wipe drilling mud, oil or water from the drill stem or well pipe as the drill stem or pipe is removed from the well without the use of water for washing the drill stem or pipe; and which may be left in position during the entire well drilling operation and does not have to be removed from the drill stem or well pipe each time the last or bottom section of such pipe or stem is removed from the well or placed on the stem or pipe when the first or bottom section is reinserted into the well, thus saving an important amount of time and labor in drilling of an oil well.

Other objects and advantages will become apparent from a consideration of the following description and the appended claims in conjunction with the accompanying drawings wherein:

Figure 1 is a somewhat diagrammatic side elevational view of a fragmentary portion of an oil well rig structure showing a wiper assembly mounted on the upper end of the surface casing of the well;

Figure 2 is a top plan view of the wiper assembly illustrated in Figure 1;

Figure 3 is a top plan view of a support structure constituting a portion of the wiper assembly;

Figure 4 is a longitudinal, medial cross sectional view of the structure illustrated in Figure 1;

Figure 5 is a top plan view of the wiper assembly, similar to Figure 2, but showing the wiper elements of the assembly separated;

Figure 6 is a top plan view of opposed slide blocks and rubber wiping elements of the wiper assembly;

Figure 7 is a fragmentary sectional view on the line 7—7 of Figure 6; and

Figure 8 is a transverse cross sectional view on the line 8—8 of Figure 1.

With continued reference to the drawings, the term oil well rig structure as used in this description includes, among other components, the drill platform **10** supported

in horizontal position above the ground by the usual supporting means, the rotary table **11** through which the drill stem **12** extends and which rotates the drill stem in the well; the flow nipple **13** depending from the rotary table in surrounding relationship to the drill stem **12**, the surface casing **14** mounted in the upper portion of the well and extending somewhat above the ground level at the top of the well and having the blow out preventer, not illustrated, included therein, and the remaining usual or necessary components of well rigs, as well known to the art.

The wiper assembly of the present invention includes a support, generally indicated at **15**, of elongated, rectangular shape comprising a pair of channel shaped guide bars **16** and **17** disposed in spaced apart and parallel relationship to each other with their open sides mutually opposed and flat plates **18** and **19** of substantially triangular shape extending one from each of the guide bars **16** and **17** toward the other guide bar and joined together at their ends remote from the guide bars substantially midway between the two guide bars. At their abutting ends plates **18** and **19** are provided with a circular aperture **20** symmetrically disposed between the guide bars **16** and **17** and having a diameter substantially equal to the outside diameter of the top end of the surface casing **14**. The top end of the surface casing is received in the aperture **20** and the support is secured to the casing by a suitable screw threaded, bolted or welded connection so that the support is mounted on the top end of the casing in substantially horizontal position and above the blow out preventer assembly of the rig structure.

A pair of flat slide blocks **21** and **22** of rectangular shape are mounted on the support **15** with their side edges slidably engaged in the guide bars **16** and **17** for movement toward and away from each other. These slide blocks are provided in their mutually adjacent ends with notches or recesses **23** and **24** respectively, of semicircular shape and with grooves extending marginally around these recesses and opening to the top surfaces of the corresponding slide blocks.

Wiper elements **26** and **27** of a suitable resiliently elastic material, such as vulcanized rubber, are carried one by each of the slide blocks and are respectively disposed in the slide block notches **23** and **24**. The wiper elements **26** and **27** are flat bodies of rubber of semicircular shape marginally received in the grooves extending around the semicircular recesses **23** and **24** in the corresponding slide blocks **21** and **22** and each wiper element has in its straight edge a semicircular notch or recess, as indicated at **28** and **29** for the elements **26** and **27** respectively. The recesses **28** and **29** are disposed symmetrically of the lengths of the straight edges of the corresponding wiper elements and, when the straight edges of the wiper elements are closed together by moving the slide blocks **21** and **22** to their limiting position toward each other, they constitute a circular aperture having a diameter substantially equal to the outside diameter of the drill stem or well pipe to be wiped.

Pneumatic or hydraulic cylinders **30** and **31** are disposed below the support **15** one at each end of the support with their center lines below and parallel to the center lines of the guide bars **16** and **17** and disposed medially of the distance between the guide bars. An arm **32** extends downwardly from the slide block **21** medially of the width of this slide block and a similar arm **33** extends downwardly from the slide block **22** medially of the width of the slide blocks. Pistons, **30'** and **31'**, are reciprocably disposed in the cylinders **30** and **31** and a piston rod **34** extending through the inner end of the cylinder **30** connects the piston in this cylinder to the lower end of the arm **32** while a piston rod **35** extending

through the inner end of the cylinder **31** connects the piston in this cylinder to the lower end of the arm **33**. Bracket arms **36** and **37** extend inwardly from the guide bars **16** and **17** to the cylinder **30** to which they are secured at their inner ends to rigidly mount the cylinder **30** in operative position on the support and similar bracket arms **38** and **39** extend inwardly from the guide bars **16** and **17** to the cylinder **31** to which they are secured to rigidly support this cylinder in operative position on the support.

The cylinders **30** and **31** are double acting and the outer ends of these cylinders are connected together by a pipe line **40** while the inner ends are connected together by a pipe line **41**. The pipe line **40** is connected by a branch pipe **42** to a manually operated four-way valve **43** and the pipe line **41** is connected to the valve **43** by a branch pipe **44**. A fluid pressure conduit **45** connects the valve **43** to a suitable source of fluid under pressure, such as a compressed air tank, and the valve is provided with an exhaust port **46** and with an operating handle **47**.

The valve **43** may be a well known form of four-way valve and is effective to connect the outer ends of the cylinders **30** and **31** to the source of fluid under pressure while connecting the inner ends of the cylinders to atmosphere through the exhaust port **46**, to connect the inner ends of the cylinders to the source of fluid under pressure while connecting the outer ends to atmosphere or to connect both ends of both cylinders to atmosphere at the same time cutting off the pressure fluid supply pipe **45**.

With this arrangement, when the valve is in one position the slide blocks **21** and **22** and the wiper elements **26** and **27** will be moved away from each other to the position shown in Figure 5 in which position a well pipe or a drill stem, such as the drill stem **12** may pass freely between the wiper elements and a drill bit or other structure of large diameter on the drill stem or well pipe may be moved between the wiper element without touching or in any way damaging the wiper element. When a drill stem, for example, is being lowered into the well, after the drill bit has passed between the wiper elements the valve **43** is operated to apply fluid under pressure to the outer ends of the cylinders **30** and **31** and vent the inner ends of the cylinders thereby moving the slide blocks **21** and **22** and the wiper elements **26** and **27** toward each other to the closed position illustrated in Figure 2. Since it is not material that the wiper elements be closed together as the drill stem is being lowered into the well, they may be left in their separated or open condition, as illustrated in Figure 5, until it is desired to withdraw the stem from the well. At this time the valve **43** will be operated to move the slide blocks **21** and **22** and the wiper elements **26** and **27** together to position illustrated in Figure 2 in which position of the wiper elements the edges of these elements surround the notches **28** and **29** engage the outer surface of the drill stem. As the drill stem sections are now withdrawn from the well the wiper elements will wipe the drilling mud, or water on the surface of the drill stem downwardly into the well as the drill stem is pulled up. As the air pressure in the cylinders **30** and **31** is of a resilient nature, as the drill stem joints or couplings **48**, which are of somewhat greater diameter than the intermediate portions of the drill stem sections, are moved between the wiper elements, these wiper elements may separate sufficiently to permit the couplings to pass therethrough without damaging or excessively wearing the rubber wiper elements, the elements being returned immediately to their engagement with the drill stem sections after the couplings pass therebetween by the resilient pressure of the air in the cylinders **30** and **31**.

When the drill bit has been brought up to the lower side of the wiper assembly the valve **43** is actuated to open the wiper assembly by moving the slide blocks **21** and **22** and the wiper elements **26** and **27** away from each other to the position illustrated in Figure 5, in which position of the wiper elements the drill stem may pass therebetween without touching the wiper elements or damaging them in any way. After the entire drill stem including the drill bit has been removed from the well the wiper assembly may be reclosed to preclude the accidental falling of heavy objects into the upper end of the well and thereby avoid the necessity of having to fish such objects from the well before drilling can be resumed.

While it has been suggested that the slide blocks and wiper elements be moved relative to the support by pneumatic means, it is to be understood that the blocks and wiper elements may be moved toward and away from each other by hydraulic, pneumatic, mechanical or electrical power means, if desired, without in any way exceeding the scope of the invention. Also, while the support **15** has been illustrated and described as mounted on the top end of surface casing **14**, it is to be understood that the support may be suspended from the drill platform **10**, from the rotatable table **11** or from the flow nozzle **13**, if such means of support should be found more convenient, without exceeding the scope of the present invention.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiment is, therefore, to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are, therefore, intended to be embraced therein.

What is claimed is:

1. A wiper assembly for oil well drill stems and pipes comprising an elongated support adapted to be mounted in substantially horizontal position adjacent the top end of an oil well, a pair of mutually opposed slide blocks mounted on said support for sliding movement relative to said support toward and away from each other, wiper elements of resiliently elastic material carried one by each of said slide blocks and projecting outwardly from the mutually opposed edges of the corresponding slide blocks to embracingly engage a drill stem or well pipe extending through said support between said slide blocks, and manually controlled power operated means connected between said slide blocks and said support to move said slide blocks and associated wiper elements toward and away from each other, said support comprising a pair of parallel guide bars of channel shape disposed with their open sides mutually opposed and a plate structure extending between and interconnecting said guide bars and having a casing receiving aperture therein disposed centrally of said support, and said slide blocks comprising flat bodies having opposite edges slidably received in said guide bars and having in their mutually opposed edges recesses marginally receiving the corresponding wiper elements.

2. A wiper assembly for oil well drill stems and pipes comprising an elongated support adapted to be mounted in substantially horizontal position adjacent the top end of an oil well, a pair of mutually opposed slide blocks mounted on said support for sliding movement relative to said support toward and away from each other, wiper elements of resiliently elastic material carried one by each of said slide blocks and projecting outwardly from the mutually opposed edges of the corresponding slide blocks to embracingly engage a drill stem or well pipe extending through said support between said slide blocks, and manually controlled power operated means connected between said slide blocks and said support to move said slide blocks and associated wiper elements toward and away from each other, said support comprising a pair of parallel guide bars of channel shape disposed with their

open sides mutually opposed and a plate structure extending between and interconnecting said guide bars and having a casing receiving aperture therein disposed centrally of said support, said slide blocks comprising flat bodies having opposite edges slidably received in said guide bars and having in their mutually opposed edges recesses of semicircular shape marginally receiving the corresponding wiper elements and said wiper elements comprising flat bodies of rubber of semicircular shape having medially of the length of their straight edges recesses of semicircular shape which constitute when said wiper elements are brought together a circular aperture of substantially the same diameter as the drill stem or pipe to be wiped.

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