

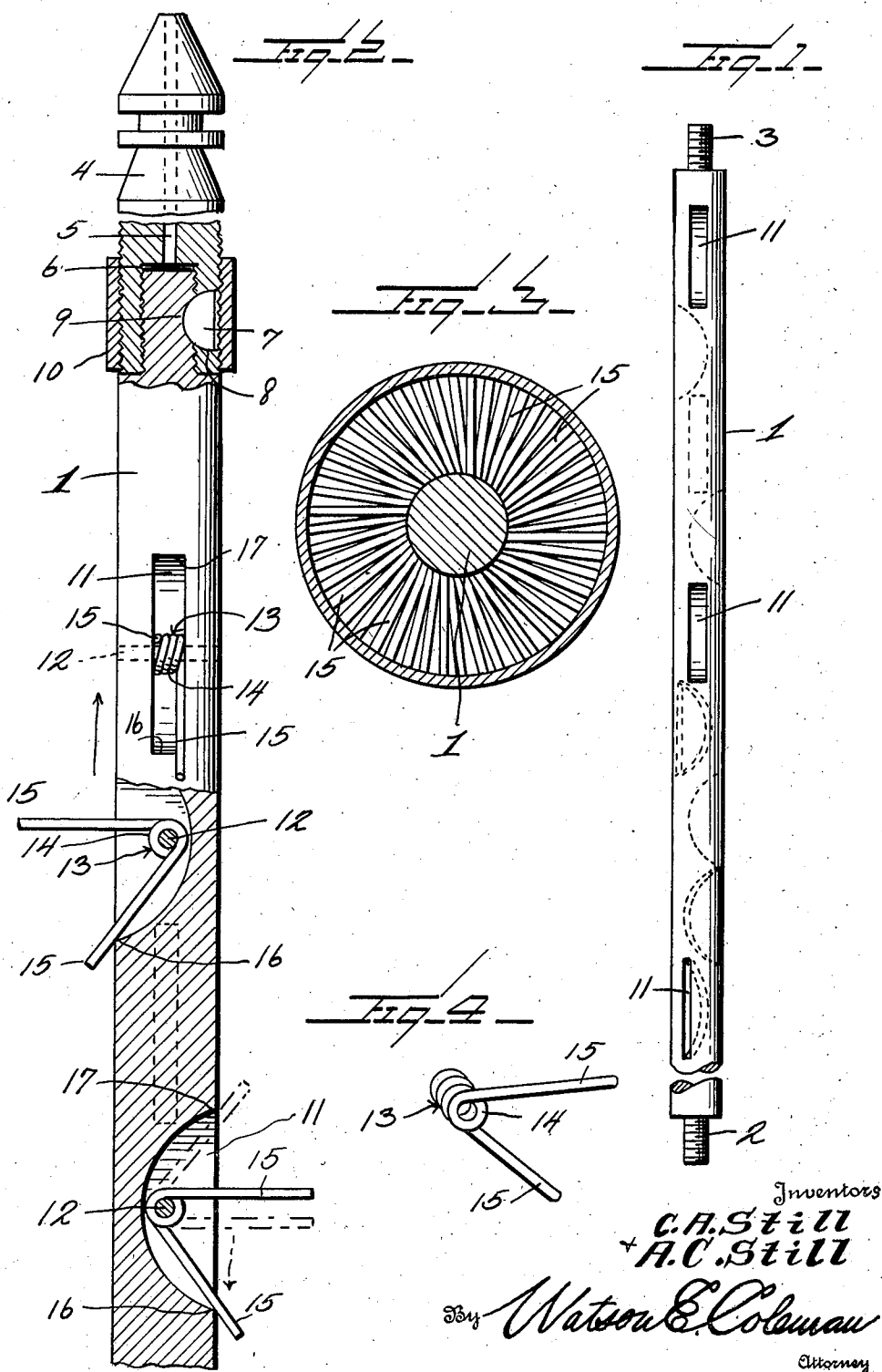
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PARAFFIN CLEANER FOR OIL WELLS

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PARAFFIN CLEANER FOR OIL WELLS

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1 Claim. (Cl. 166—18)

This invention relates to improvements in well cleaning devices and pertains particularly to an improved paraffin cleaner for oil wells.

The primary object of the present invention is to provide a cleaning device for oil wells by means of which paraffin deposits may be removed from the inner surface of the well pipe by the passage into the well of a body carrying a plurality of shiftable fingers, such fingers being constructed and arranged on the body so that they will have a cleaning action in the movement of the body in both its downward passage and in its return passage through the well pipe.

Another object of the invention is to provide a device for cleaning paraffin deposits from the inner surface of a well pipe wherein the cleaning fingers which are employed are arranged in such a manner that the entire inner surface of the pipe will be cleaned by the movement of the device in one direction through the well pipe, this action being accomplished by arranging the cleaning fingers in spiral order around the body, by which they are carried so that they provide in top plan a completely circular scraping means which substantially covers the entire inner surface of the pipe as the finger carrying device moves downwardly therethrough.

In some types of wells such as "dead" wells and "gaslift" wells, cleaning operations have to be carried out from the upper end of the well downwardly, and the device of the present invention is designed particularly for the smooth performance of this operation and also for the cleaning of the well pipe from the lower end upwardly, this function being accomplished by the provision of a plurality of pairs of connected scraper fingers which are supported upon a carrier body to oscillate upon axes extending transversely thereof so that one finger of each pair is permitted to oscillate into a position to function in the movement of the device downwardly in the well and the other finger of each pair oscillates into working position to facilitate the cleaning of the well as the device is moved upwardly therethrough.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawing forming part of this specification, with the understanding, however, that the invention is not to be confined to any strict conformity with the showing of the drawing but may be changed or modified so long as such changes or modifications mark no material departure from the salient features of the invention as expressed in the appended claim.

In the drawing:

Fig. 1 is a view in elevation of the body portion of the device embodying the present invention, the fingers being removed.

Fig. 2 is a view partly in side elevation and partly in longitudinal section and upon an enlarged scale of the upper portion of the device.

Fig. 3 is a transverse sectional view through the device and through a pipe in which the device is located showing the cleaner finger arrangement.

Fig. 4 is a view in perspective of a finger unit.

Referring now more particularly to the drawing, the numeral 1 generally designates the body of the present paraffin cleaner or scraper device, which body is in the form of a steel rod or shaft of suitable diameter which at its lower end may be provided with a threaded reduced extension 2, by means of which the device may be connected with a sinker rod, if desired.

At the upper end of the body 1, a similar reduced extension 3 is provided which is exteriorly threaded and is designed to have connected therewith an adapter unit 4, which comprises in the structure here shown, a body having the same overall diameter as the body 1, having a central longitudinal bore 5 therethrough which at its lower end merges with an enlarged interiorly threaded socket 6 into which the threaded extension 3 may be secured. The bore 5 is intended to receive a suspension cable, the lower end of which is secured by the extension 3 against the inner end of the socket 6, so that the cleaner device may be raised and lowered by such cable.

In order that the adapter may be maintained against undesired turning upon the extension 3, there is provided a key 7 which is insertible through a slot 8 in the lower end of the adapter body for engagement in a recess 9 formed in the side of the extension 3. This key couples the adapter and the body 1 together and it is kept from coming out of position by the threaded collar 10 which is arranged around the lower end of the adapter and threaded thereon over the slot 8.

In carrying out the present invention, the body 1 is provided with a number of longitudinally extending slots 11, which may be milled in the body or otherwise suitably formed therein, these slots being arranged in a series extending spirally about the rod 6. The slots are only slightly offset one from the other circumferentially of the rod body and they may be also arranged so as to have their ends either in slightly overlapping relation or in adjacent relation so

that the slots form a continuous series around the body and are relatively closely spaced together.

Extending transversely through each of the slots 11 is a pivot pin 12 and upon each of these pivot pins is oscillatably mounted or supported a twin finger scraper unit indicated generally by the numeral 13. Each of these scraper units comprises a sleeve portion 14 and a pair of scraper fingers 15, which are connected with and extend from the sleeve portion in divergent relation and preferably tangential to the sleeve portion. While this unit may be made in any suitable manner, it is preferred that it be formed from a single piece or length of suitable weight spring wire, the piece of wire being wound intermediate its ends into a spiral to form the sleeve which is here indicated by the numeral 14, thus leaving the fingers 15 as end extensions of the sleeve. The length of the sleeve 14 is approximately equal to the width of the recess or slot in which it is mounted upon the pivot pin 12 and this pin extends transversely through the slot as shown, preferably substantially midway between the ends of the slot although this may not be essential.

When the cleaner units are mounted upon their supporting pins in their respective slots, the fingers will extend a substantial distance outwardly beyond the exterior surface of the rod body 1 and under normal conditions, when the rod 6—1 is held in vertical position, these cleaner units will drop down and the lower one of the two fingers will bear against the lower transverse edge 16 of the slot in which the unit is mounted. The disposition of the two fingers of each unit is such that when the lower finger is in lowered or dropped position, the adjacent or upper finger will extend outwardly substantially perpendicularly to the rod body. This is the position which the cleaner units assume in their respective slots when the cleaner device is in the lower part of the well or is being pulled upwardly through the well. When the device is being lowered into the well, the fingers will bear against the paraffin coating on the inner surface of the well and will be rocked upwardly so that the upper end of the fingers of each unit

will then bear against the top cross edge 17 of the slot in which the unit is located and the lower finger of the unit will then extend straight outwardly from the body so as to effectively scrape the paraffin from the surface of the well pipe. Thus from the foregoing, it will be apparent that the device of the present invention functions to scrape the inner surface of the well pipe free or clean of paraffin or other deposited material both when the device is lowered and when it is drawn upwardly in the well.

By reason of the spiral arrangement of the series of fingers, it will be readily apparent that the entire inner surface of the well pipe will be contacted as the device is lowered or as it is raised, thus such surface will be effectively cleaned by moving the device down and up in the pipe line.

As previously stated, it is preferred that the cleaning units be formed from wire material, therefore, the fingers 15 will be of circular form and while under some conditions the outer ends of the fingers may be flattened so as to present a wider scraping edge, it is found that the life of the fingers is materially increased if they are used in their original round form and in addition, the desired cleaning or scraping action is not made less efficient.

What is claimed is:

A paraffin cleaner for oil wells comprising an elongated body designed for passage through a well pipe, said body having a plurality of recesses therein, a cleaner unit for each recess and having two working positions with respect thereto, each unit comprising an inner portion located in a recess and a pair of fingers extending in divergent relation from the inner portion, and means pivotally connecting each inner portion with the body for oscillation on an axis extending transversely of the body, the angle between the fingers being such that upon oscillation of the unit to the extreme of either of its two working positions, one finger will engage the body and the other finger will extend therefrom perpendicular to the long axis of the body.

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