

Dec. 29, 1959

H. A. JOHNSON

2,918,974

WALL SCRATCHER

Filed Oct. 22, 1957

2 Sheets-Sheet 1

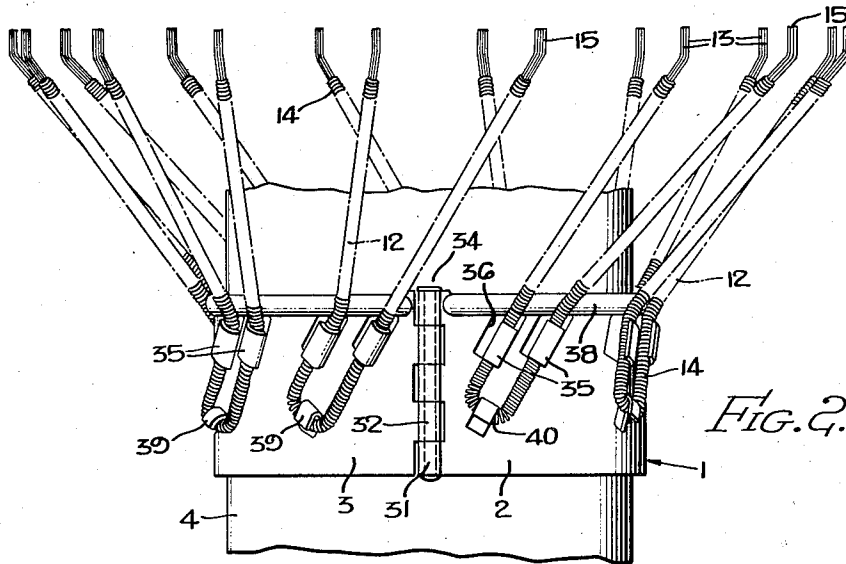
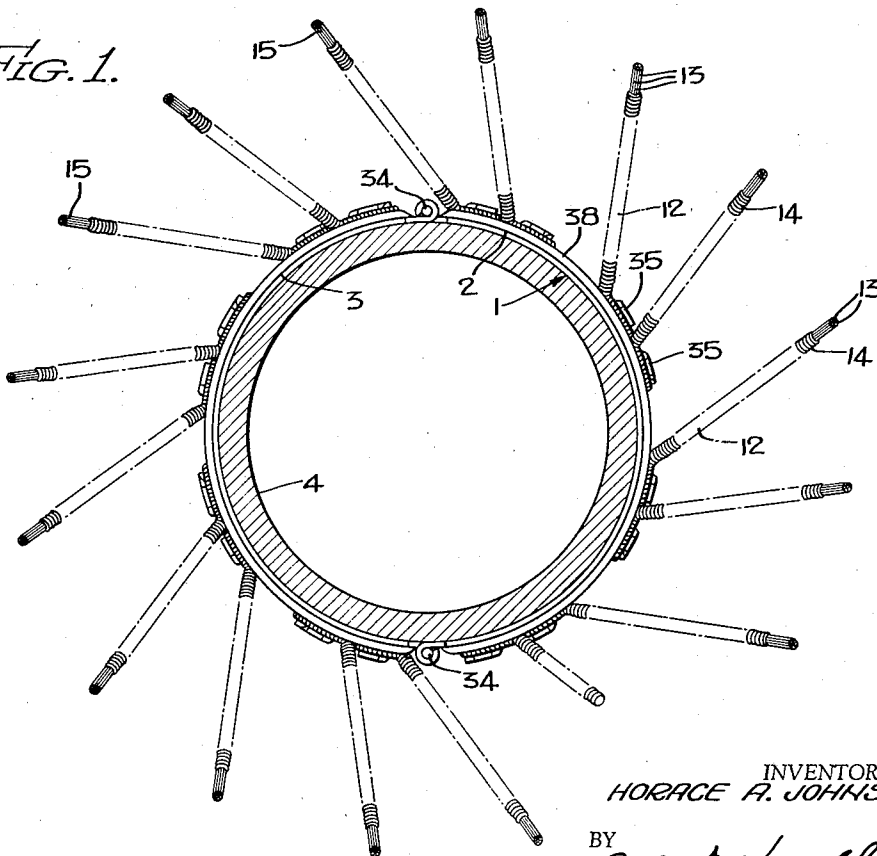


FIG. 2.

FIG. 1.



INVENTOR,
HORACE A. JOHNSON

BY

Allen C. Hambley

ATTORNEY

Dec. 29, 1959

H. A. JOHNSON
WALL SCRATCHER

2,918,974

Filed Oct. 22, 1957

2 Sheets-Sheet 2

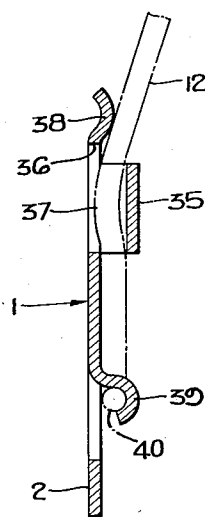
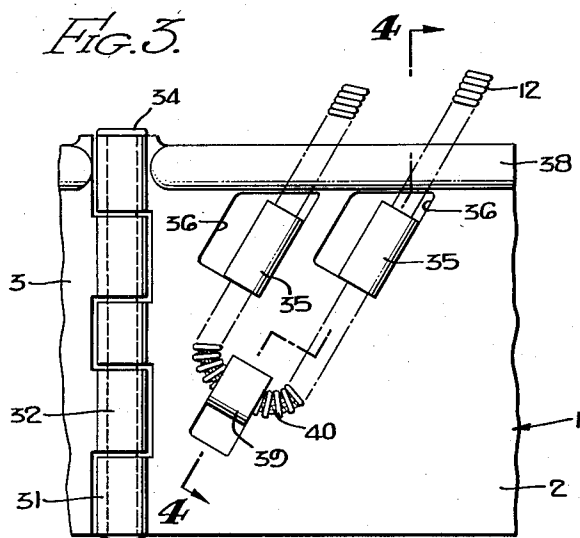


FIG. 4.

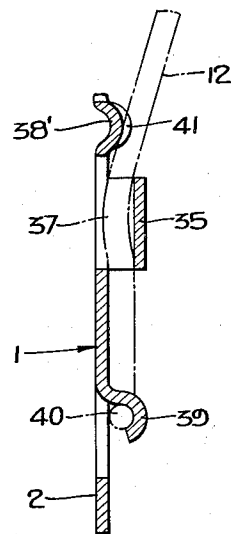
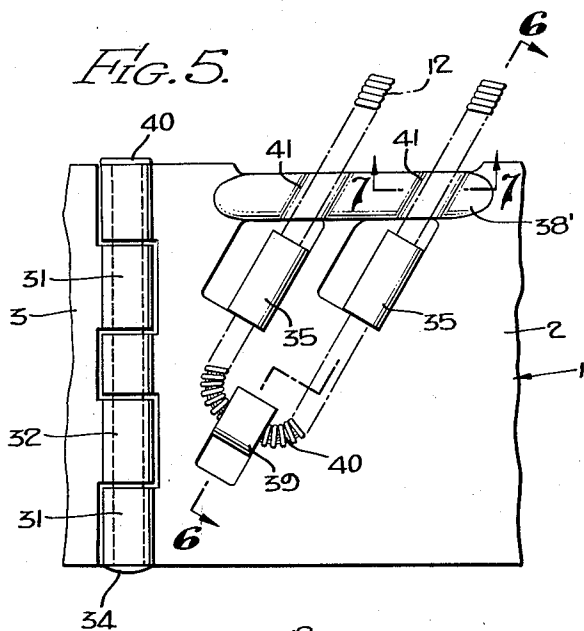


FIG. 6.

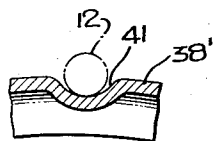


FIG. 7.

INVENTOR,
HORACE A. JOHNSON

BY

Allen C. Hambley
ATTORNEY

1

2,918,974

WALL SCRATCHER

Horace A. Johnson, Van Nuys, Calif., assignor to Borg-Warner Corporation, Chicago, Ill., a corporation of Illinois

Application October 22, 1957, Serial No. 691,648

13 Claims. (Cl. 166—173)

The present invention relates to wall scratchers for use in certain oil and/or gas well treating operations.

In the treatment of oil and gas wells it frequently becomes necessary or desirable to scratch the surface of the borehole wall to remove mud cake which is deposited thereon during the circulation of drilling fluid or mud down the drill pipe and up through the annulus between the pipe and the borehole. Such wall scratching or filter cake removal is particularly desirable prior to cementing a casing in place in the borehole.

Heretofore, scratchers have been provided for this purpose, including an annular collar adapted to encircle a string of pipe with a plurality of scratcher fingers radiating from the collar for engagement with the surrounding borehole.

A primary object of the present invention is to provide an improved scratcher of this general type, wherein improved means are provided for supporting the scratcher fingers on the collar.

A further object is to provide a supporting collar having scratcher fingers thereon, wherein the collar is provided with means for flexing the fingers laterally with respect to the collar for engagement of the fingers with the borehole wall.

Another object is to provide a wall scratcher having a plurality of circumferentially spaced scratcher elements secured thereto, wherein the collar is formed with a circumferentially extended outward projection underlying the scratcher elements so as to flex the fingers generally laterally with respect to the collar.

Still another object is to provide a structure in accordance with the next preceding objective, wherein each of said scratcher elements comprises an elongated wire scratcher element folded back upon itself or recurved to provide a pair of spaced scratcher fingers, said projection underlying the fingers being in the form of a rib formed on the collar approximately at the upper end of the collar. Such a rib, in accordance with the invention, may be continuous about the collar or it may be in the form of short ribs underlying the respective individual scratcher fingers or pairs of fingers. In addition the projection may be formed with a scratcher finger receiving depression or other means for positioning the fingers with respect to one another.

Other objects and advantages of the invention will be hereinafter described or will become apparent to those skilled in the art, and the novel features thereof will be defined in the appended claims.

In the accompanying drawings:

Fig. 1 is a top plan view, showing a wall scratcher made in accordance with the invention;

Fig. 2 is a view in side elevation of the scratcher of Fig. 1;

Fig. 3 is an enlarged fragmentary detail view in elevation, showing a scratcher element secured to a supporting collar, with a rib on the collar underlying the scratcher fingers, in accordance with one form of the invention;

2

Fig. 4 is a view in section, as taken on the line 4—4 of Fig. 3;

Fig. 5 is a view corresponding to Fig. 3, but showing a short collar projection underlying the scratcher fingers, in accordance with another form of the invention;

Fig. 6 is a view in section, as taken on the line 6—6 of Fig. 5; and

Fig. 7 is a detail view in section, as taken on the line 7—7 of Fig. 5.

Like reference characters in the several views of the drawings and in the following description designate corresponding parts.

Referring to Figs. 1 and 2 of the drawings, the wall scratcher hereof comprises a cylindrical supporting collar 1, which is preferably composed of a pair of similar half-sections 2 and 3. The half-sections 2 and 3 are preferably detachably interconnected so that the collar may be easily mounted upon a pipe or casing generally designated 4. In this illustrative embodiment, the collar sections 2 and 3 are shown as having cooperative hinge means 31 and 32 respectively, interconnected as by means of hinge pins 34, so that the collar 1 may be readily applied to the pipe or casing 4 and removed therefrom, by insertion and removal of one of the hinge pins 34.

A plurality of flexible scratcher elements 12 are disposed about the collar 1, and each element is recurved or folded back upon itself so as to be generally U-shaped, and has a pair of scratcher fingers constituting a free scratching portion, while the bases of the scratcher elements are secured to the body 1 and constitute a mounting portion. Each wire comprises a bundle or group of individual, relatively thin, steel wires 13 which are encased in a coil spring 14, but which project from the case 14 at their free ends, as at 15.

The mounting portion of the scratcher elements 12, in accordance with this embodiment of this invention, are secured on the outer, cylindrical wall of the body or collar 1, as by means of a suitable number of tabs or ribs 35 which are struck out of the collar sections 2 and 3, and which are bent over the scratcher fingers of the respective scratcher elements 12. Preferably, the opening formed in the collar sections by punching out the tabs 35 is enlarged as indicated at 36. Therefore, upon bending the tabs 35 into engagement with the underlying fingers the fingers are bowed into the openings 36 as indicated at 37 in Figs. 4 and 6.

It should be noted that the openings 36 extend axially of the collar 1 substantially to the base of a radially outwardly projecting rib or protuberance 38 as seen in Fig. 3 or 38' as seen in Fig. 5. Such protuberance may be of any desired form, however, other than the rib 38 which extends substantially from end-to-end of each half collar section 2 or 3, or the interrupted or short ribs 38' which extend beneath the respective scratcher elements. As is best seen in Figs. 4 and 6, it will be noted that the ribs 38 and 38' serve as means for flexing the scratcher fingers of the elements 12 somewhat radially with respect to the collar. Depressing the fingers into the openings 36 increases the effective height of the ribs 38 and 38'.

In addition to the tabs or ribs 35, the collar sections 2 and 3 are also preferably punched to provide another tab 39 adapted to engage the base 40 of the respective recurved scratcher elements 12.

Means are also preferably provided for restraining deflection of the scratcher fingers toward and away from one another. In this connection, the ribs 38' are shown as being provided with a pair of recesses or depressions 41 therein, in which the scratcher fingers seat. Obviously, the elongated rib 38 may also be provided with such depressions or seats if desired.

Other changes and alterations may be resorted to with-

out departing from the spirit of the invention as defined in the appended claims.

I claim:

1. A wall scratcher device of the class described adapted to be mounted on a well pipe or casing, comprising: an annular collar, a flexible scratcher element having a mounting portion and a free scratching portion projecting past an end of said collar, means securing said mounting portion on said collar, and means for reinforcing said collar including an outstanding projection formed integrally with said collar adjacent the end of said collar past which said free scratching portion projects and underlying said free scratching portion, said free scratching portion being engaged with said projection and deflected thereby outwardly from said collar.

2. A wall scratcher as defined in claim 1, wherein said projection constitutes a rib extending circumferentially of said collar.

3. A wall scratcher as defined in claim 1, wherein said projection constitutes a rib on said collar, said rib having a depression in which said scratcher element is seated.

4. A wall scratcher as defined in claim 1, wherein said projection constitutes a marginal rib extending circumferentially of said collar.

5. A wall scratcher as defined in claim 1, wherein said securing means comprises a tab on said collar overlying said mounting portion of said scratcher element.

6. A wall scratcher as defined in claim 1, wherein said securing means comprises a tab on said collar overlying said mounting portion of said scratcher element, said tab being disposed adjacent to said projection.

7. A wall scratcher as defined in claim 1, wherein said securing means comprises a tab on said collar overlying said mounting portion of said scratcher element, said tab being disposed adjacent to said projection, said collar having an opening therein adjacent to said projection, and said tab overlying said opening, and said scratcher element having a section extending across said opening and depressed into said opening by said tab.

8. A wall scratcher as defined in claim 1, wherein said

scratcher element is generally U-shaped and includes a pair of spaced scratcher fingers.

9. A wall scratcher as defined in claim 1, wherein said scratcher element is generally U-shaped and includes a pair of spaced scratcher fingers, said projection comprising a rib projecting laterally from said collar and underlying said scratcher fingers.

10. A wall scratcher as defined in claim 1, wherein said scratcher element is generally U-shaped and includes a pair of spaced scratcher fingers, said projection comprising a rib projecting laterally from said collar and underlying said scratcher fingers, said rib having a depression therein in which said scratcher fingers are seated.

11. A wall scratcher as defined in claim 1, wherein said projection has means providing a seat for said scratcher element.

12. A wall scratcher device of the class described adapted to be mounted upon a well pipe or casing, comprising: an annular collar, a plurality of flexible scratcher elements disposed in circumferentially spaced relation about said collar, each scratcher element being generally U-shaped and having a pair of scratcher fingers projecting from said collar past an end of the latter, and means for reinforcing said collar including an outstanding projection formed integral with said collar adjacent the end of said collar past which said scratcher fingers project and underlying said scratcher fingers, said scratcher fingers being engaged with said projection for flexing the same outwardly of said collar.

13. A wall scratcher as defined in claim 12, wherein said projection is in the form of a circumferentially extended rib.

References Cited in the file of this patent

UNITED STATES PATENTS

2,713,912	Baker	July 26, 1955
2,735,495	Hall	Feb. 21, 1956