

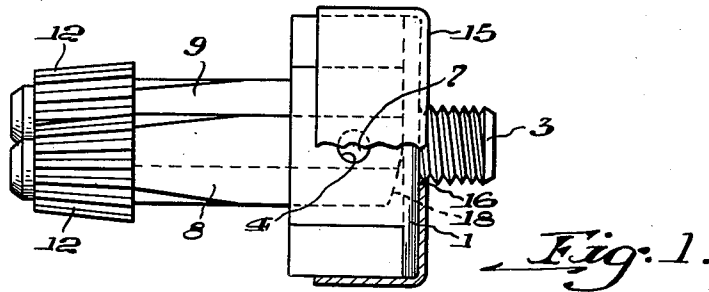
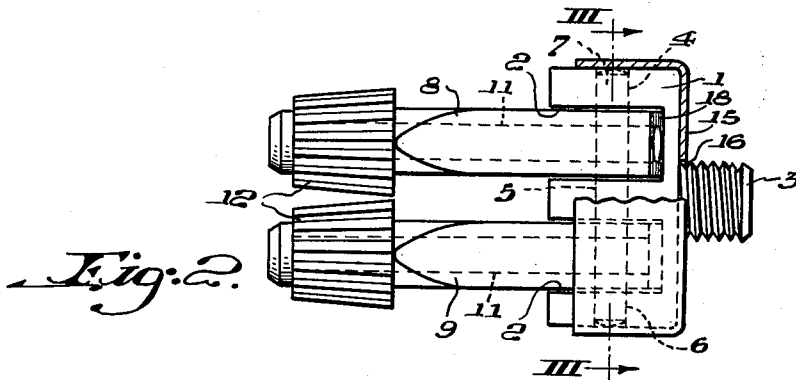
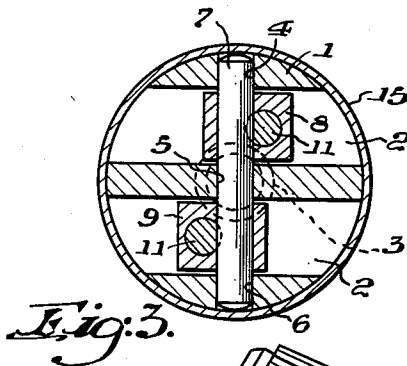
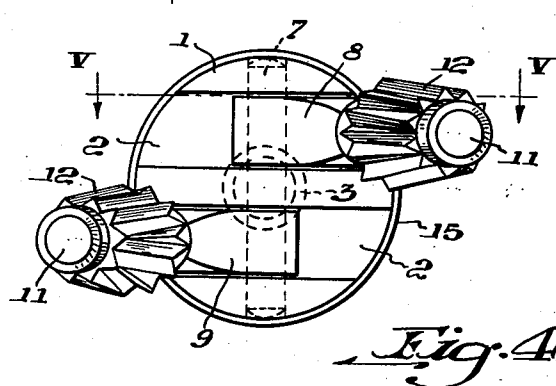
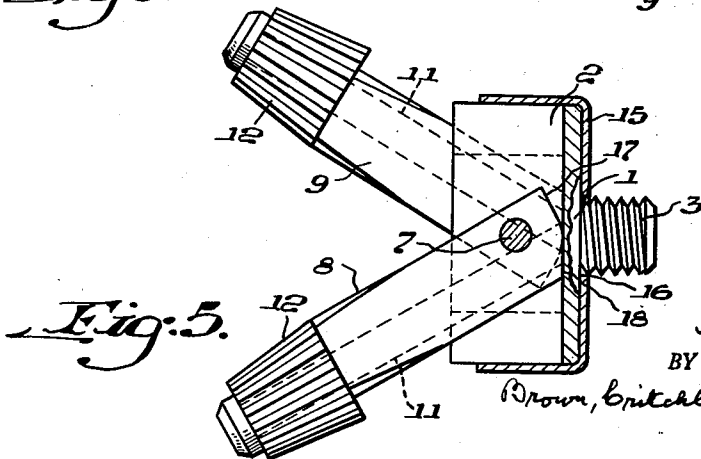
May 20, 1952

J. P. RODGERS

2,597,263

TWO-ARM EXPANDING HEAD TUBE CLEANER

Filed Dec. 30, 1950



INVENTOR.
JAMES P. RODGERS.
BY
Brown, Britchlow, Flick & Beckham
his ATTORNEYS.

UNITED STATES PATENT OFFICE

2,597,263

TWO-ARM EXPANDING HEAD TUBE
CLEANERJames P. Rodgers, Belleville, N. J., assignor to
Elliott Company, Jeannette, Pa., a corporation
of Pennsylvania

Application December 30, 1950, Serial No. 203,633

4 Claims. (Cl. 15—104.14)

1

2

This invention relates to expanding heads for cleaning tubes and the like, and more particularly to rotating heads provided with only two pivoted arms.

Heretofore, in cleaning curved tubes of small diameter by means of rotary heads it has been the general practice to use a type of head which depends for its effectiveness upon combined vibration and cutting due to centrifugal force. The vibration is hard on both the cutter and the tube wall. The two-arm cutters on the market can not be made small enough to be practical for curved tubes of two inch diameter. They have a multiplicity of parts and are made in such a way that they are not balanced, which results in rough cleaning and severe action on the cutter head parts, the motor that drives the head and the tubes being cleaned.

It is among the objects of this invention to provide a rotary cutting head which has only two arms, which can be used effectively for cleaning small curved tubes, which is formed from a minimum number of parts, which can be quickly assembled and repaired, and which is well balanced during its rotation.

In accordance with this invention, a spider is provided at its front end with a pair of parallel slots extending across it. Preferably, the spider is cylindrical and has a stud at its rear end for rotating it. The spider is provided with aligned holes extending transversely through it perpendicularly to the slots. A pin extends through these holes and across the slots. A single arm is disposed in each slot and extends forward from it. The rear ends of the arms are pivotally mounted on the pin to permit the front ends of the arms to swing outward in opposite directions. Cutting members are mounted on the front ends of the arms. The pin is held in the spider by means of an encircling cup.

The preferred embodiment of the invention is illustrated in the accompanying drawings, in which Fig. 1 is a side view of the head with the cutter arms extending straight ahead and with part of the cup broken away; Fig. 2 is a similar view of the head rotated 90°; Fig. 3 is a cross section taken on the line III—III of Fig. 2; Fig. 4 is a front view of the head with the arms swung apart as far as they will go; and Fig. 5 is a section taken on the line V—V of Fig. 4.

Referring to the drawings, a short and generally cylindrical member 1 has a pair of parallel slots 2 milled in its front end, from which they extend rearward into the member to a point near its rear end. The slots preferably extend en-

tirely across the member. The spider thus formed has a threaded stud 3 projecting from the center of its rear end for connecting the spider to a flexible cable (not shown) by which it can be rotated at high speed. The central portion of the spider is provided with three aligned holes 4, 5 and 6 extending transversely through it in a direction perpendicular to the slots. Preferably, these holes extend diametrically across the spider.

Fitting slidably in the spider holes is a pin 7 on which the rear ends of a pair of arms 8 and 9 are pivotally mounted. One arm is disposed in each slot, and the two arms extend forward from the spider. As is customary with such arms, each one is provided with a longitudinal passage in which a cutter pin 11 is slidably disposed. Each pin 11 projects from the front end of its supporting arm, between which and the head on the front end of the pin the usual cone cutter 12 is pivotally mounted on the pin. As indicated in Figs. 3 and 5, the rear end of the cutter pin is provided in its side with a notch which registers with a portion of the transverse passage through the rear end of the arm through which the pivot pin 7 extends. Consequently, the pivot pin 7 locks the two cutter pins 11 in the arms 8 and 9.

To keep the pivot pin from sliding out of the spider, the latter is disposed in a cup 15. The side wall of the cup encircles the spider and covers the opposite ends of the pivot pin, while the back wall of the cup is provided with a central opening 16 through which the spider stud 3 projects. When the head is in use, the cup is held on the spider by the coupling (not shown) that connects the threaded stud to the driving cable.

The pivot pin passage through the rear end of each arm preferably is disposed closer to one side of the arm than the other. In other words, it is located at one side of the longitudinal axis of the arm. As shown in Figs. 1 and 3, this arrangement permits the arm to be located closer to one side of the spider than otherwise would be the case, so that the cone cutter will not engage the surrounding tube at too sharp an angle. The two arms are mounted on pivot pin 7 offset from each other; that is, one arm is closer to one side of the spider while the other arm is closer to the other side of the spider.

It is preferred to form the arms so that they can only swing out of the side of the spider to which they are closer. This can be accomplished by having a surface 17 (Fig. 5) of the rear end of each arm adjacent the corner near-

3

est to the pivot pin engage the back wall of the slot 2 when the arm extends substantially straight ahead, as shown in Figs. 1 and 2. This will prevent the two arms from swinging from their straight-ahead position across each other. The rear end surface 18 of each arm between surface 17 and the other side of the arm is inclined forward and is therefore spaced from the back wall of the spider slot when the arm extends straight ahead. This space permits the arm to swing outward in one direction, as shown in Figs. 4 and 5, until inclined surface 18 engages the back wall of the slot and stops further movement of the arm. When the head is rotated in the right direction, centrifugal force swings the front ends of the two arms outward in opposite directions until the cone cutters engage the deposit inside the tube being cleaned.

It will be seen that with the construction disclosed herein both cutter arms are held in place by a single locking pin which can be slid out as soon as the cup has been removed from the spider. The way in which the two arms are mounted side by side in parallel slots permits the cutting head to have a small diameter and yet provide for considerable outward movement for the cutters. With more movement for the arms, they can be made shorter than heretofore and yet expand as much as desired. Such a short head can travel around sharp bends in tubes. The spider can be made round to correspond to the shape of the tube being cleaned, and a round spider is better balanced during rotation so that it does not vibrate appreciably.

According to the provisions of the patent statutes, I have explained the principle of my invention and have illustrated and described what I now consider to represent its best embodiment. However, I desire to have it understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

I claim:

1. A two-arm expanding head for cleaning tubes and the like, comprising a spider provided at its front end with a pair of parallel slots extending across it, the spider also being provided with aligned holes extending transversely through it perpendicularly to the opposite sides of the slots midway between their ends, a pin extending through said holes and across the slots, a single arm disposed in each slot and extending forward therefrom, the rear ends of the arms being pivotally mounted on said pin to permit the front ends of the arms to swing outward in opposite directions, cutting members mounted on the front ends of the arms, and a cup having a side wall encircling the spider and covering the ends of said pin to hold it in the spider, the cup having a rear wall behind the spider provided with a central opening for receiving a head-rotating member.

2. A two-arm expanding head for cleaning tubes and the like, comprising a cylindrical spider provided at its front end with a pair of parallel slots extending across it, the spider also being provided with aligned holes extending diametrically through it perpendicularly to the opposite sides of the slots, a pin extending through said holes and across the slots, a single arm disposed in each slot and extending forward therefrom, the rear ends of the arms being pivotally mounted

4

on said pin to permit the front ends of the arms to swing outward in opposite directions, cutting members mounted on the front ends of the arms, and a cup having a side wall encircling the spider and covering the ends of said pin to hold it in the spider, the cup having a rear wall behind the spider provided with a central opening for receiving a head-rotating member.

3. A two-arm expanding head for cleaning tubes and the like, comprising a cylindrical spider provided at its front end with a pair of parallel slots extending across it, the spider also being provided with aligned holes extending diametrically through it perpendicularly to the opposite sides of the slots, a pin extending through said holes and across the slots, a single arm disposed in each slot and extending forward therefrom, the rear end of each arm being provided at one side of its longitudinal axis with a transverse passage receiving said pin to permit the front end of the pin to swing outward, the arms being mounted on the pin with its axis disposed on opposite sides of the longitudinal axes of the arms so that the arms are offset from each other, cutting members mounted on the front ends of the arms, and a cup having a side wall encircling the spider and covering the ends of said pin to hold it in the spider, the cup having a rear wall behind the spider provided with a central opening for receiving a head-rotating member.

4. A two-arm expanding head for cleaning tubes and the like, comprising a spider provided at its front end with a pair of parallel slots extending across it, the spider also being provided with aligned holes extending transversely through it perpendicularly to the opposite sides of the slots midway between their ends, a pin extending through said holes and across the slots, a single arm disposed in each slot and extending forward therefrom, the rear ends of the arms being pivotally mounted on said pin to permit the front ends of the arms to swing outward, the back walls of the slots being substantially flat, the rear end surface of each arm having a flat area near one side of the arm for engaging the back wall of the slot when the arm extends substantially straight ahead, said rear end surface near the other side of the arm being inclined forward from said flat area to permit the arm to swing in one direction away from its straight ahead position, cutting members mounted on the front ends of the arms, and a cup having a side wall encircling the spider and covering the ends of said pin to hold it in the spider, the cup having a rear wall behind the spider provided with a central opening for receiving a head-rotating member.

JAMES P. RODGERS.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
48,819	Marshall	July 18, 1865
1,032,193	Elliott	July 9, 1912

FOREIGN PATENTS

Number	Country	Date
62,072	Sweden	Aug. 5, 1924