

No. 850,739.

PATENTED APR. 16, 1907.

S. F. DIBSDALE.
BOILER TUBE CLEANER.
APPLICATION FILED SEPT. 1, 1905.

FIG. 1.

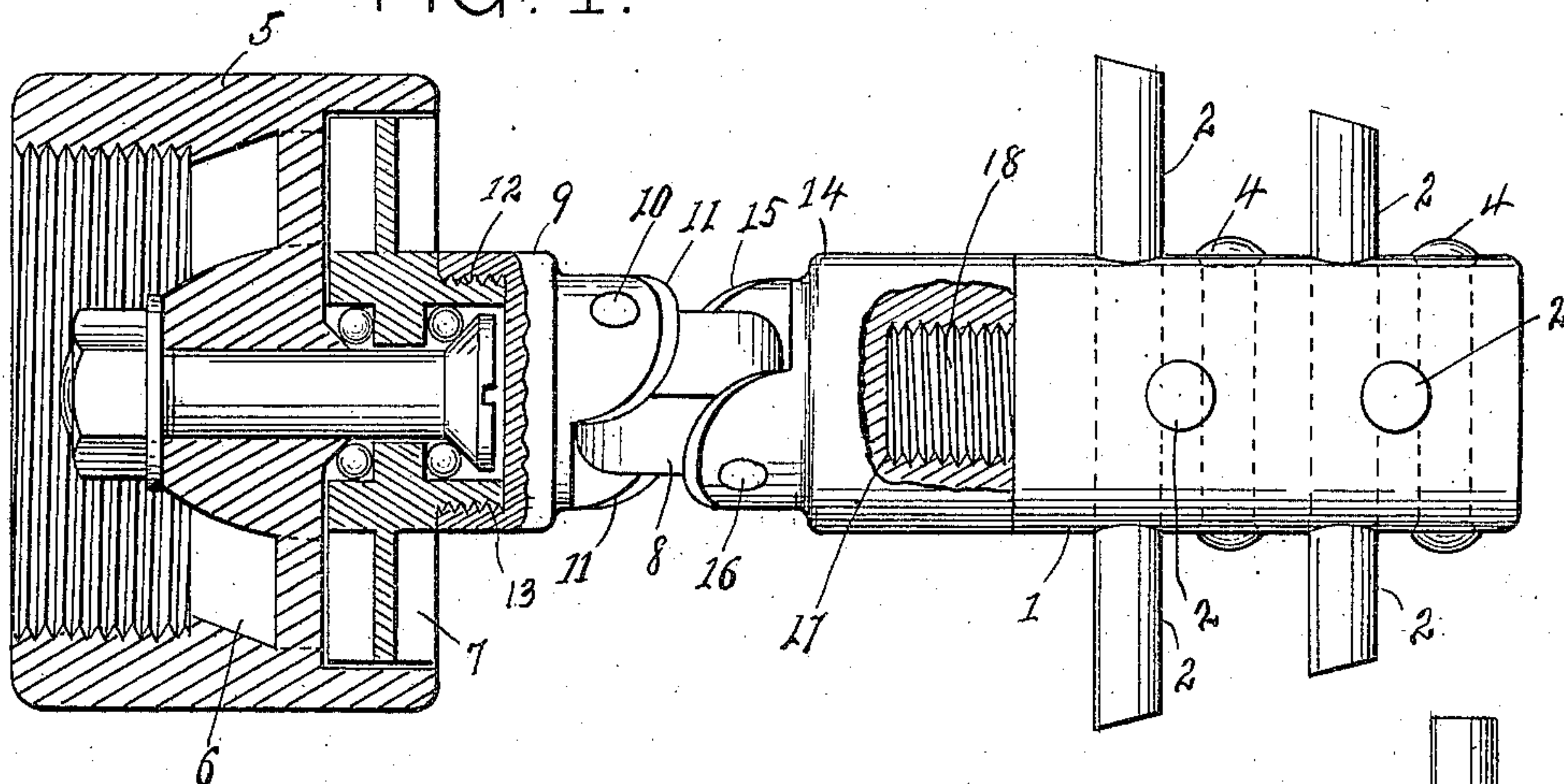


FIG. 6.

FIG. 2.

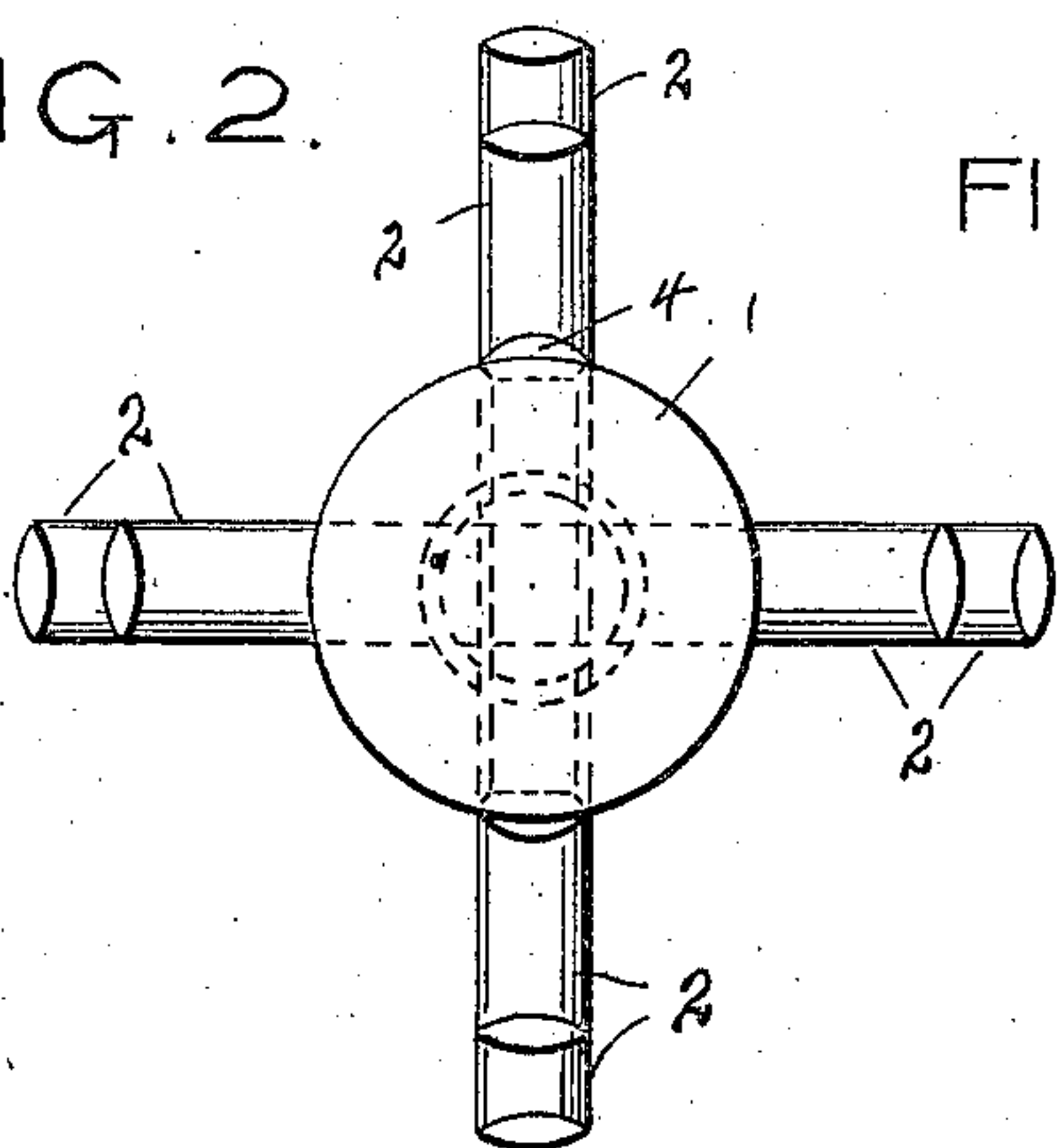


FIG. 3.

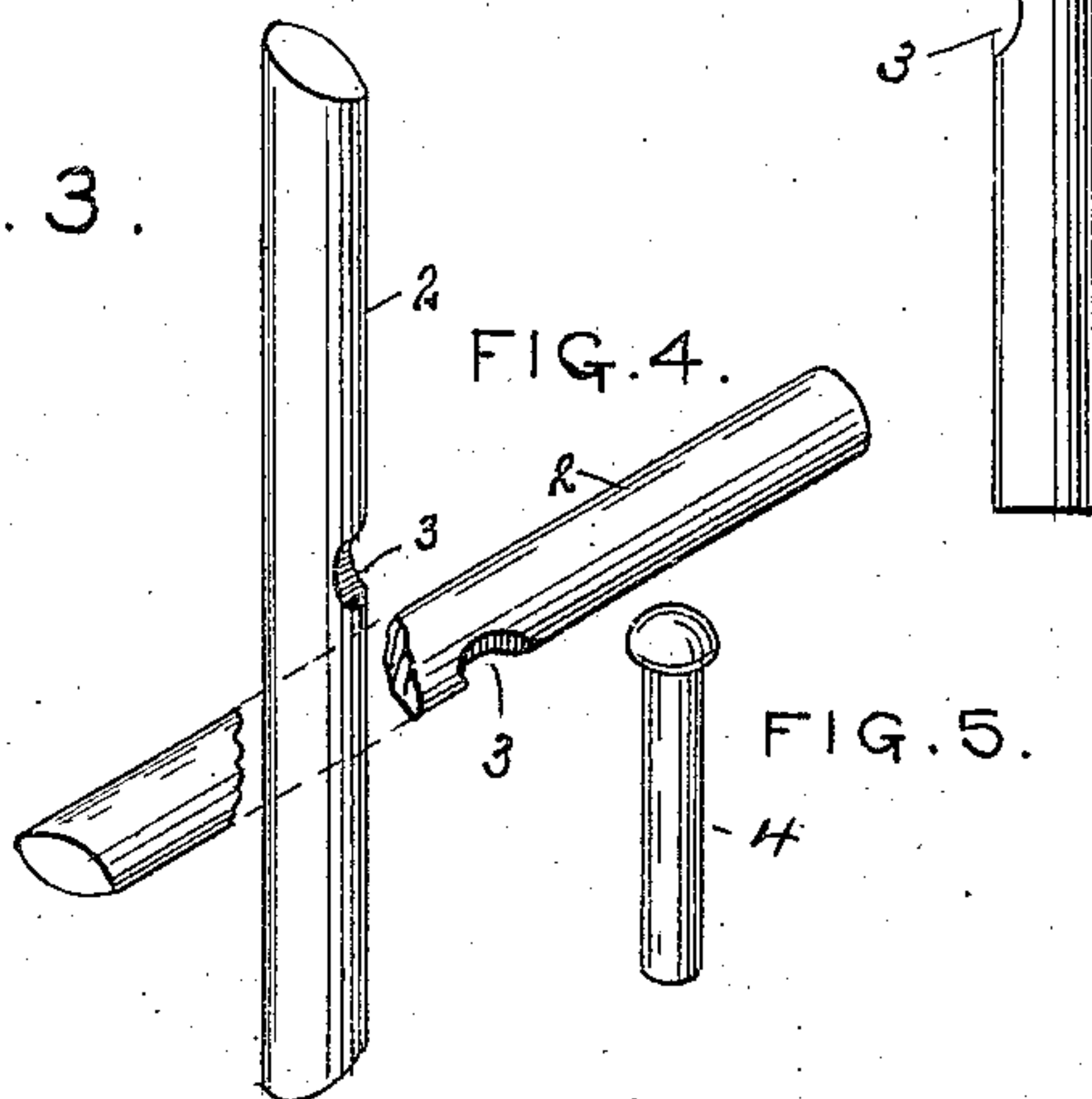


FIG. 4.

FIG. 5.

WITNESSES.
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BOILER-TUBE CLEANER.

No. 850,739.

Specification of Letters Patent.

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Application filed September 1, 1905. Serial No. 276,683.

To all whom it may concern:

Be it known that I, SAMUEL F. DIBSDALE, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Boiler-Tube Cleaners, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to boiler-tube cleaners, and more particularly to that type of cleaner in which a cleaner-head rotated at a high velocity is passed through the tube to be cleaned and being connected with its driver by a universal joint or coupling acts upon the scale through the medium of centrifugal force to break up or disintegrate and remove the same.

In the accompanying drawings, Figure 1 is a view of a structure embodying my invention in one form, the same being shown partly in section and illustrating my improved cleaner-head as connected to a turbine-motor of approved construction. Fig. 2 is a front elevation of the head detached. Figs. 3, 4, and 5 illustrate in perspective the cleaner pins or fingers and the fastening-pin constituting one group in relative positions in advance of that assumed when assembled; and Fig. 6 is a view of a modified form of the pin or finger detached.

In carrying out my invention I employ a cleaner-head which is connected at its rear end to the driver by a universal coupling, the body of said head being of relatively small diameter and preferably cylindrical in form and having rigid picking fingers or pins extending radially outward therefrom and separated from each other by ample clearance-spaces much greater in extent or area than the diameters of the pins or fingers. The pins or fingers are preferably arranged in annular or circumferential groups around the body of the head, one group in advance of the other, the groups of pins increasing in length rearwardly, the forward pins being relatively short and the rearward pins relatively long, so that when the body of the head assumes an angular position to the axis of the tube the ends of the working pins will be about equidistant from the wall of the tube on which they work. The ends of the pins may be beveled off or inclined, so as to

bring their end surfaces into parallelism with the axis of rotation and wall of the tube when the body of the head is thus inclined in its working position.

Referring to the accompanying drawings, 1 indicates the body of the cleaner-head, which is preferably cylindrical in form and of much less diameter than the tube to be operated upon. Pins or fingers 2 extend radially outward from this head and are of such dimensions and so located as to leave ample clearance-spaces between said pins of much greater area than the area of the pins themselves. I prefer to arrange the pins in annular or circumferential groups separated by comparatively wide intervals much greater in length than the diameter of the pins. In the present instance I have shown two of these annular groups of pins; but this number may be increased, if desired.

It will be observed that the pins of the forward group are shorter than those of the rear group and that the ends of the pins are beveled or inclined forward and inward. It results from this construction that when the body 1 under centrifugal force assumes an angular position in the tube by reason of its universal connection with its driver the ends of the pins which contact with the wall of the tube or with the incrustation thereon are about equidistant from said wall, striking the incrustation practically simultaneously, since the preferred arrangement of the pins is that shown, in which the pins of one group are in longitudinal alinement with the pins of the other group or groups. Where the ends are beveled, as is preferred, the pins strike squarely with their ends against the incrustation. I have shown a preferred mode of connecting the pins to the head proper, in which each group comprises four projections or fingers, constituted by two pins, which extend diametrically through the body of the head and beyond the same at each end, crossing each other at right angles. In this construction two apertures are formed through the head at right angles to each other, one intersecting the other, and a third aperture is formed parallel with the first aperture and similarly intersecting the second aperture. The pins are centrally notched on one side, as indicated at 3, and one of the pins being first inserted through one of the two parallel

apertures until its notch or recess 3 registers with the aperture at right angles thereto. The second pin is then inserted through said aperture at right angles, being so turned that its full portion or body engages in the notch of the pin first inserted and locks the same in position, while the notch of the second pin registers with the second parallel aperture. A locking-pin 4 is then inserted through the second parallel aperture and has its heads enlarged, swaged, or riveted up or is otherwise secured in position, thus locking the second pin in position, said second pin in turn locking the first pin in position. In this way the pins are firmly held in place in a simple and effective manner, but may be readily removed and replaced when worn or broken by the removal of the locking-pin. By reason of this construction the body of the head may be inexpensively made, as by casting, while the fingers or pins may be made of high-grade steel or other suitable material and readily removed and replaced.

The cleaner-head is connected to the driver by a universal joint or coupling, as already stated. In the present instance I have shown the driver as a turbine-motor of an approved type, comprising a casing 5, adapted to be connected to a hose or other means for supplying water under pressure thereto, said casing having guide-passages 6, which direct the water in jets against a turbine water-wheel 7, mounted to rotate in the casing. The universal coupling may be of any approved form, that which I have shown being well known and comprising a block or link 8, to which is connected a coupling member 9 by means of a pivot 10, passing through ears 11, forming part of the coupling member, and through the block 8. The coupling member 9 is adapted to be connected to the driver or water-wheel, having a threaded socket 12 to screw onto the correspondingly-threaded hub 13 of the wheel. The other coupling member 14 has lugs 15 to receive a pivot 16, which also passes through the block 8 in a direction at right angles to the pivot 10. The coupling member 14 has a threaded socket 17, into which screws a threaded shank 18 on the end of the cleaner-head 1.

In practice the cleaner-head, being rotated at a high velocity within the tube by its driver, assumes a position inclined to the axis of the tube, its free forward end moving outward toward the wall of the tube. This brings the ends of the fingers into contact with the incrustation, and the said fingers act upon the incrustation with a picking action, being thrown against the same by centrifugal force, rebounding after each blow and again being thrown outward against the incrustation after each rebound, thus delivering a rapid succession of hammer-like blows with the ends of the pins. By extended practical tests I have found that these pins thus car-

ried around by the rotatory motion of the head and at the same time moving radially outward and striking the sediment with their ends will effectually loosen and remove the same, frequently breaking the hard sediment into long flakes or scales and detaching them from the tube. I attribute this very efficient action of the pins in a large degree to the fact that they strike the scale at points which are comparatively widely separated and that the large intervening clearance-spaces between the pins materially contribute to the successful detaching of the scale, as they permit the scale to move away from the wall of the tube when struck and loosened, the scale being not held to its position or prevented from separating by other contacting parts in close proximity to the pins which have just delivered their blow. A further element of efficiency is the gradation of the pins so that they will strike along the entire length of the head and their longitudinal alinement, so that a plurality of pins will strike practically simultaneously along the same longitudinal line of the wall of the tube, although ample clearance-space is left between the pins, which thus strike the scale at the same time. In practice I have found that this head has a very high efficiency, removing scale when used with a turbine-motor adapted to travel through the tube, which scale could not be removed by the cleaner-heads ordinarily used in connection with such turbine-motors and would require for its removal the use of a power-cleaner, positively driven by an external motor.

I do not wish to be understood as limiting myself to the precise details of construction hereinbefore described, and shown in the accompanying drawings, as the same may obviously be modified without departing from the principles of my invention. For instance, the number of groups of pins may be varied, as well as the number of pins in each group. Furthermore, pins having their ends in planes at right angles to their axes, as illustrated in Fig. 6, may be employed instead of the beveled pins shown in the remaining figures.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A boiler-tube cleaner comprising a rotary driver adapted to substantially fit the tube to be cleaned, a universal coupling carried by said driver, a cleaner-head reduced in diameter compared with the driver, and connected to the driver by said universal coupling, and rigid picking fingers or pins projecting outwardly from the cleaner-head, separated from each other by wide and deep clearance-spaces, the fingers or pins composing a forward group of shorter length than the diameter of the driver and a rear group of length substantially equal to the diameter of

the driver, whereby the driver will properly fill the tube to center the machine, whereby the head may gyrate as well as rotate, and whereby the fingers or pins will enter within the incrustation in the tube and yet will cut the same away out to the tube.

2. In a boiler-tube cleaner of the character described, a cleaner-head comprising a body having formed therethrough two parallel apertures and a third aperture intersecting said parallel apertures at right angles, all of said apertures being transverse to the longitudinal axis of the body, pins passing through two of said apertures at right angles to each

other and extending beyond the body to form picking-fingers, one of said pins being notched to cause said pins to interlock and the other of said pins being notched to interlock with a locking-pin, and a locking-pin secured in the third aperture and engaging the pin notched to receive it, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

SAMUEL F. DIBSDALE.

Witnesses:

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CHARLES H. BURROWS.