

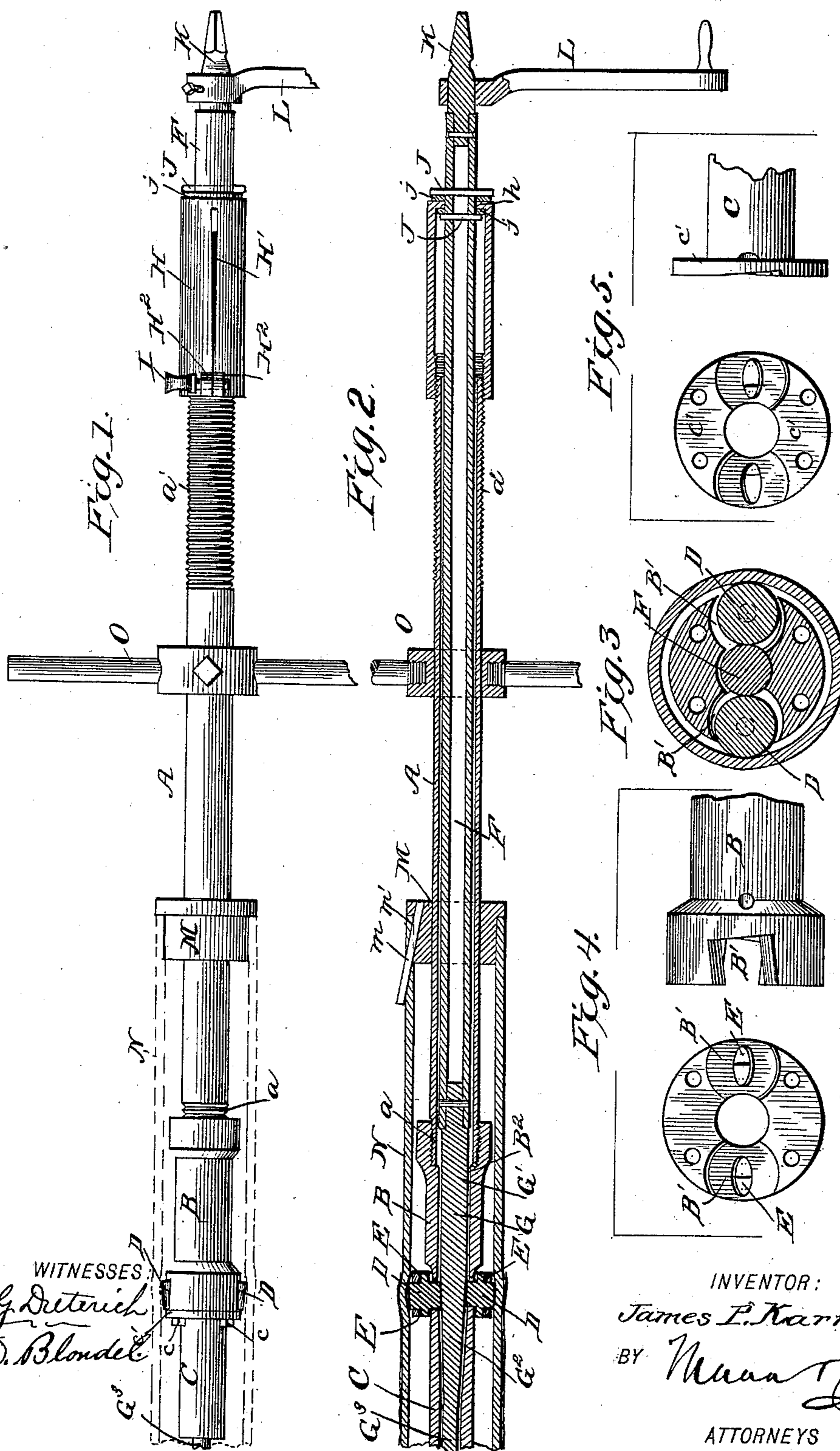
(No Model.)

J. P. KARR.

APPARATUS FOR REMOVING INCRUSTATION FROM BOILER TUBES.

No. 421,135.

Patented Feb. 11, 1890.



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UNITED STATES PATENT OFFICE.

JAMES P. KARR, OF MONTICELLO, INDIANA.

# APPARATUS FOR REMOVING INCRUSTATION FROM BOILER-TUBES.

SPECIFICATION forming part of Letters Patent No. 421,135, dated February 11, 1890.

Application filed December 18, 1889. Serial No. 334,226. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES P. KARR, residing at Monticello, in the county of White and State of Indiana, have invented an Improved Apparatus for Removing Incrustation from Boiler-Tubes, of which the following is a specification.

My invention has for its object to provide simple and effective means for removing incrustation from boiler-tubes, such means being those illustrated and referred to in my previous application, Serial No. 303,965, in which I claim a process for removing said incrustations; and it consists in certain novel arrangement and peculiar combination of parts, all of which will hereinafter be fully described in the annexed specification, and particularly pointed out in the claims, reference being had to the accompanying drawings, in which—

Figure 1 is a side view of my improved apparatus, showing a boiler-tube in dotted lines. Fig. 2 is a longitudinal central sectional view of the same, the tube being shown in full lines. Fig. 3 is a cross-section of the same on the line 3 3, Fig. 2. Fig. 4 is a detail view of the upper end of the casing, and Fig. 5 is a detail view of the end piece of the same.

In the practical construction of my apparatus I form it so that in operation it will temporarily enlarge a tube in opposite directions, so that the incrustation covering it will crack and fall off, while the tube will return—*i. e.*, spring back—to its original size. To this end I provide a tube A, which may be a piece of gas-pipe of such length to suit the length of the tubes to be operated on, the forward end of such tube A being formed with a short exterior screw-thread *a*, upon which is screwed a metal casting B, upon the forward end of which an end piece C is secured by means of screws *c c*, passing through its flange *c'* into the end of the casting B, in the forward end of which are formed two opposite openings B' B', in which are mounted steel rollers D D. These rollers are mounted at an angle to the length of the casting, as shown, and are of a greater diameter than the thickness of the sides of the casing in which they are mounted, the end pivots or axles of such rollers being seated in oblong openings E, which enable the said rollers to move in or out to a certain extent, as hereinafter described.

F indicates the operating-rod, which may be a length of gas-pipe of suitable diameter, in the forward end of which is secured by rivets the portion G, commonly called the "needle." The rear third G' of the length of this needle is of equal diameter through all its length. It then tapers in size for the middle third, as at G<sup>2</sup>, to about one-half its original diameter, and the remaining third G<sup>3</sup> of the needle is of an equal diameter throughout, as shown. The bore B<sup>2</sup> of the rear part of the casting B fits snugly the rear part G' of the needle, while the bore C' of the front end of the end piece C fits the reduced end G<sup>3</sup> of the needle, this construction serving to steady and center the needle and prevent any movement thereof to either side.

The rear end of the tube A is formed with an exterior screw-thread  $a'$ , and on this end fits an interiorly-threaded sleeve-cap H, the opening  $h$  in the outer end of which fits the rod F, while the sleeve is slotted longitudinally from its forward end to a point near its rear end, and is formed at its forward end on each of the slots H' with the opposite lugs H<sup>2</sup> H<sup>2</sup>, through which a thumb-screw I passes. The sleeve H is held from sliding on the end of the rod F by pins J J, passing through the rod on each side of the cap-head, washers  $j$  being disposed on the rod between the pins and the cap-head, as shown.

In the rear end of the rod F is riveted a pin K, having its outer end squared to fit a 85 crank-handle L, by which the rod is turned.

In operation the end piece C and casting B are inserted in the end of an incrustated tube N, turning the casting to work it into the end of the tube, and a flanged collar M, through which the tube A passes, is inserted in the end of the tube N, and may be held therein by a key *m*, passing through an opening *m'* in the collar M, said collar serving to center and steady the tube A. The screw-cap H is then turned forward on the threaded end of the tube A, when it will carry the rod F forward with it and as the tapered part G<sup>2</sup> of the needle G is thus worked forward it presses against the rollers D, and moves them out until they press out against the sides of the tube. The rollers can thus be adjusted out to suit the bore of the incrustated tube, and when adjusted out sufficiently far the

cap H is secured at that point on the tube A by tightening the thumb-screw I, thus tightening and locking the slotted cap-sleeve on the tube A. It will be seen that when the rod F is now turned by its handle L the needle G will revolve the rollers D D, and it will also be seen that as these opposite rollers revolve they will force the tube out at the points where they press against its inner side, as shown in Fig. 3, thus cracking and breaking the rigid incrustation on the outside of the tube and causing it to fall off. The rollers D D being mounted in the casting B at an inclination or angle to the bore of the tube, as before stated, as they revolve they will work in a spiral around the inside of the boiler-tube, and will thus work along through the length of the tube, feeding forward automatically. As the inclined rollers thus pass forward through the tube in a spiral every inch of the incrustated tube will temporarily expand, (pressed outward,) and, while the metal tube will give to this pressure, the rigid coating of incrustation will be cracked and broken, and will fall off the tube, while as the rollers move forward the expanded portions of the tube will spring back and resume their previous shape and size.

The apparatus can be operated either by turning the rod F by its handle or by turning the tube A by a suitable lever, as the double-handled lever O, turning the tube A advancing the device most rapidly, while turning the rod F by its handle gives the most power with a slower movement.

From the foregoing description, taken in connection with the drawings, it will be observed that the apparatus can be adjusted to fit different-sized tubes, thereby removing the incrustation from the tubes in a simple and effective manner without removing the tubes from the boiler.

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

1. A tube-cleaner consisting of a tool having opposite projecting rollers adjustably held thereon adapted to bear against the inner wall of the tube, a tapering needle disposed between the adjacent inner faces of said rollers, and means for wedging said needle between the rollers to expand them laterally, substantially as and for the purpose described.

2. In a tube-cleaner, the combination of the tube, the casting mounted on the forward

end of the same and having the opposite openings and oval bearings, the end piece having the oval bearings and having its bore reduced near its outer end, the inclined adjustable rollers, and the adjustable needle having the tapered middle, substantially as set forth.

3. In a tube-cleaner, the combination of the tube having the threaded ends, the casting mounted on the forward end thereof and having the opposite openings and oval bearings, the end piece having oval bearings and having its bore reduced near its outer end, the inclined adjustable rollers, the threaded sleeve-cap, and the rod having at its forward end the needle formed with tapered middle part, the stop-pins near its rear end, and the squared rear end piece, substantially as set forth.

4. In a tube-cleaner, the combination of the tube, the casting, the end piece for the same, the inclined adjustable rollers, the threaded sleeve-cap formed with a longitudinal slot and opposite lugs and having the thumb-screw, and the rod having the tapered needle at forward end and the stop-pins and squared end piece at its rear end, substantially as set forth.

5. In a tube-cleaner, the combination of the tube, the casting, the end piece for the same, the inclined adjustable rollers, the flanged collar through which the tube passes, the threaded sleeve-cap formed with the longitudinal slot and the opposite lugs and having the thumb-screw, the rod having the tapering needle at its forward end and the stop-pins and squared end piece at its rear end, and the operating-handles, substantially as set forth.

6. An apparatus for removing incrustation from boiler-tubes, consisting of a body portion having rollers journaled thereon having radial adjustment, a tapering needle operating between the adjacent inner faces of said rollers to force same radially outward to engage the said tube, said rollers journaled at an angle to the longitudinal axis of the body portion, and means for rotating said body portion, whereby the rollers will bear against the inner wall of said tube and travel spirally forward thereon, substantially as and for the purpose set forth.

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