

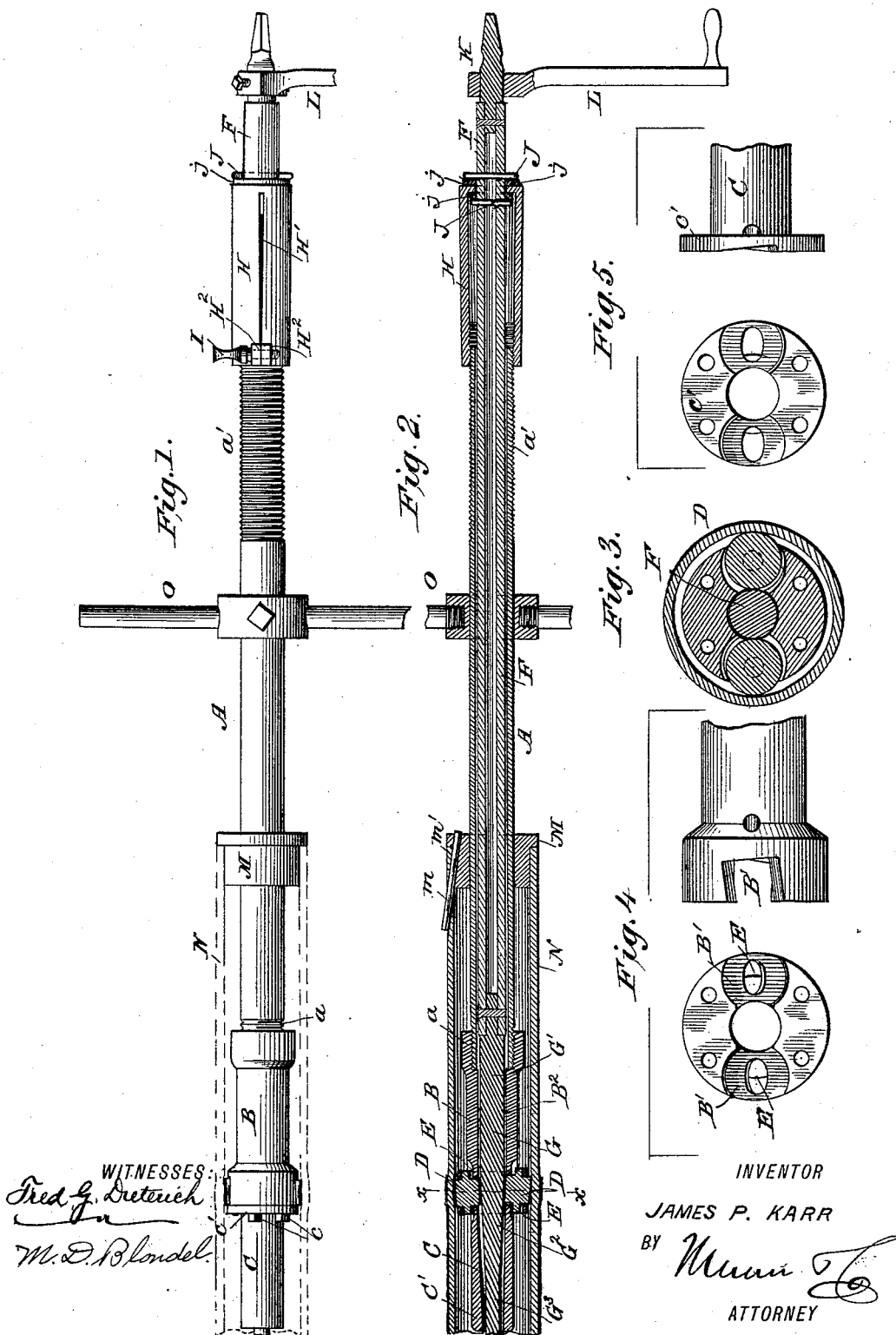
(No Model.)

J. P. KARR.

PROCESS OF REMOVING INCRUSTATION FROM BOILER TUBES.

No. 420,689.

Patented Feb. 4, 1890.



UNITED STATES PATENT OFFICE.

JAMES P. KARR, OF MONTICELLO, INDIANA.

PROCESS OF REMOVING INCRUSTATION FROM BOILER-TUBES.

SPECIFICATION forming part of Letters Patent No. 420,689, dated February 4, 1890.

Application filed March 20, 1889. Serial No. 303,965. (No model.)

To all whom it may concern

Be it known that I, JAMES P. KARR, of Monticello, in the county of White and State of Indiana, have invented a new and useful
5 Improvement in the Process of Removing Incrustation from Boiler-Tubes, of which the following is a specification.

My invention consists in the hereinafter-described process of removing incrustation
10 from boiler-tubes, as will be hereinafter fully set forth and claimed.

Referring to the accompanying drawings, in which I illustrate the apparatus by means of which I prefer to carry my new and im-
15 proved process into effect, Figure 1 is a side elevation of the 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
20 sectional view taken on the plane indicated by line *xx* of Fig. 2. Fig. 4 shows in detail the upper end of the casing, and Fig. 5 shows in detail the end piece of the same.

The same letters of reference indicate corresponding parts in all the figures.

The process of my invention consists in temporarily enlarging a tube in opposite directions, so that the incrustation covering it will crack and fall off, while the tube will return and spring back to its original size, not
30 being permanently enlarged or expanded by the process. This process can be put into effect by a variety of devices, and I hereby illustrate and describe an apparatus which I
35 have invented and which accomplishes this object in a perfect manner, and this apparatus will form the subject-matter of a separate application for Letters Patent. I will fully
40 illustrate and describe this apparatus and its operation in order to clearly set forth my new process.

Referring to the several parts of the apparatus by letter, A indicates a tube or pipe, which may be a length of gas-pipe, and this
45 pipe A may be of any desired length to suit the length of the tubes to be treated. The forward end of this tube is formed with a short exterior screw-thread *a*, and upon it is
50 screwed a metal casting B, upon the forward end of which an end piece C is secured by

screws *c*, passing through its end flange *c'* into the end of the casting.

In the forward end of the casting B are formed two opposite openings B' B', and in these openings are mounted steel rollers D. 55 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 axes of the rollers are seated
60 in oblong openings E, which enable the 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. 65 In the forward end of this rod is secured by rivets the "needle" G, as it may be called. The rear third G' of the length of this needle is of equal diameter through all its length. Then the needle tapers in size for the middle
70 third G² of its length to about one-half its original diameter, and the remaining third G³ of the needle is of an equal diameter throughout, as shown. The bore B² of the rear part of the casting B fits snugly the rear
75 part G' of the needle, while the bore C' of the front part of the end piece C fits the reduced end G³ of the needle, this construction serving to steady and center the needle and prevents any movement to either side. 80

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
85 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 side of the slot H', with the opposite
90 lugs H² H³, 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, as shown, and washers *j* may be placed on the rod between the pins and the cap-head.

In the rear end of the rod F is riveted a
95 pin K, having its outer end squared to fit a 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
100 *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. This collar M serves 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 G² 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 end. It will be seen that when the rod F is now turned by its handle L the needle G will revolve the rolls D D; and it will 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 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 rolls thus pass forward through the tube in a spiral, every inch of the incrustated tube will be temporarily expanded, 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 rolls move forward the expanded points of the tube will spring back and resume their previous form and size.

The machine 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.

It will be seen that my process will effectually remove incrustation from boiler-tubes in a thorough and perfect manner, and that the apparatus can be adjusted to fit different-sized tubes. The incrustation is thus removed from the tubes without removing the tubes from the boiler.

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

1. The herein-described process of removing incrustation from boiler-tubes, consisting in temporarily enlarging the tubes in opposite directions, substantially as set forth.
2. The herein-described process of removing incrustation from boiler-tubes within the boiler, consisting in temporarily enlarging the tubes by means of a tool having opposite projecting rolls traveling in a spiral, substantially as set forth.

JAMES P. KARR.

Witnesses:

SOLON C. KEMON,
CHAS. A. PETTIT.