

(No Model.)

W. D. FORSYTH & E. T. BELL.
BOILER TUBE CLEANER.

No. 605,951.

Patented June 21, 1898.

Fig. 1.

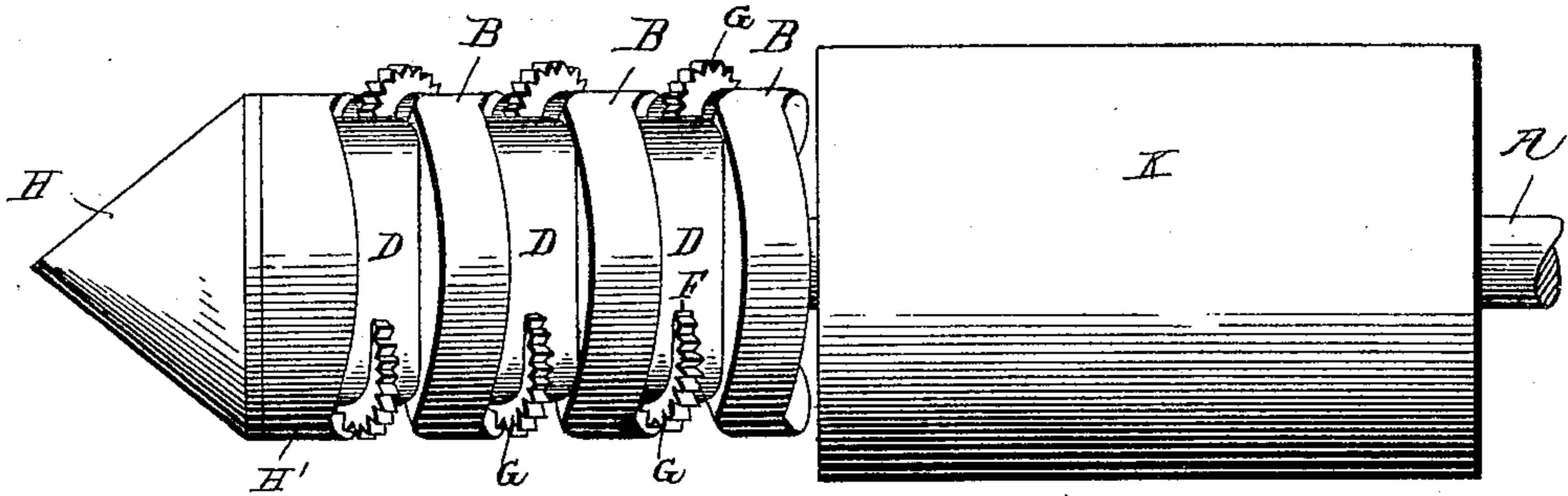


Fig. 2.

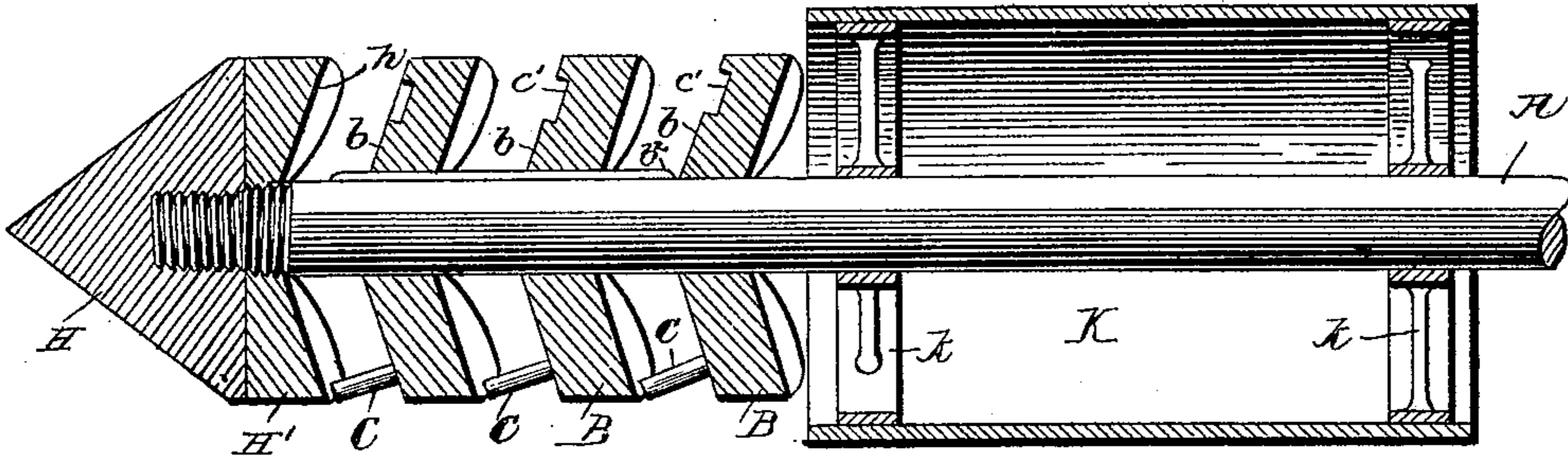


Fig. 3.

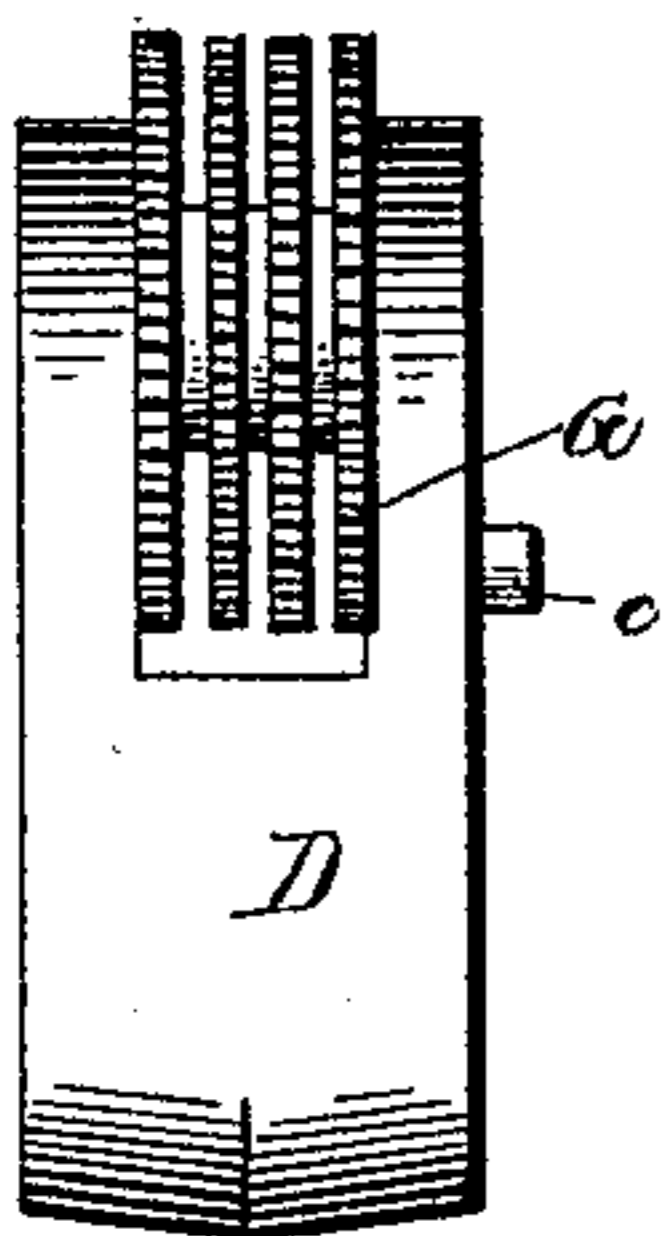


Fig. 5.

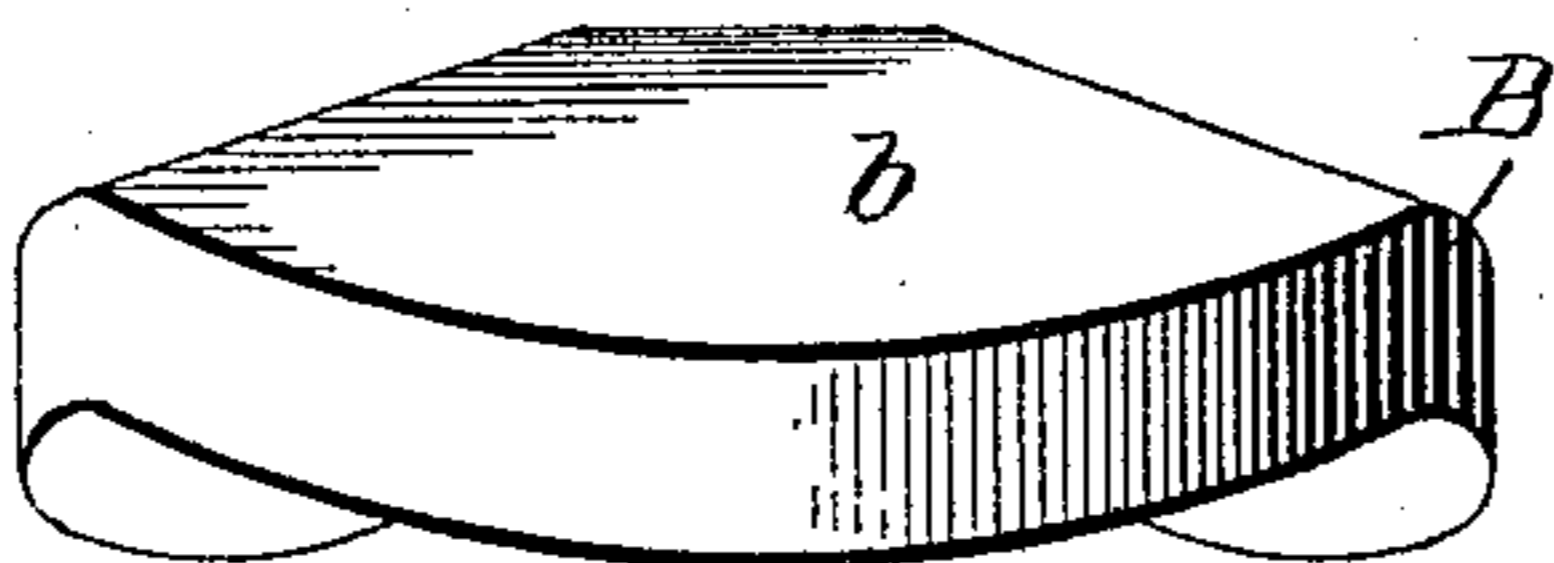


Fig. 4.

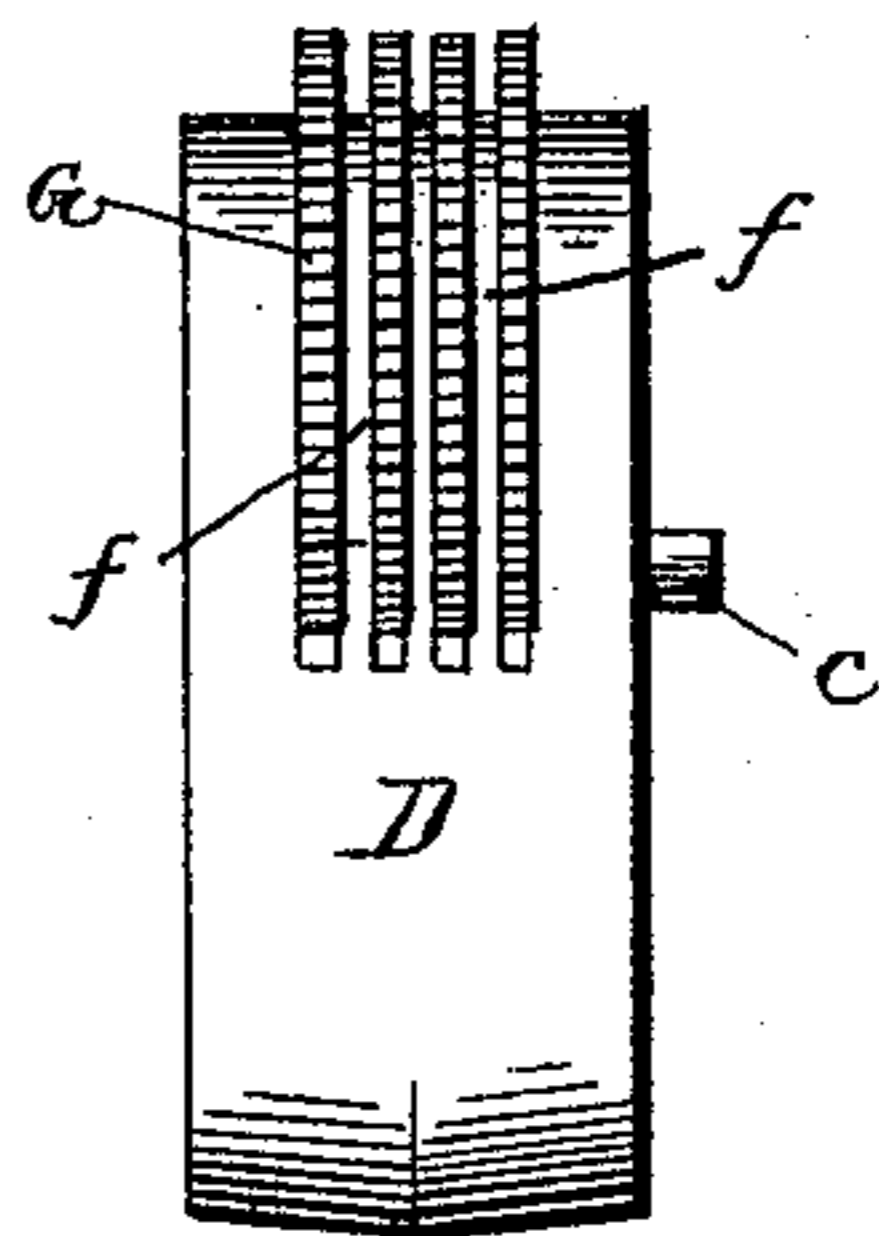
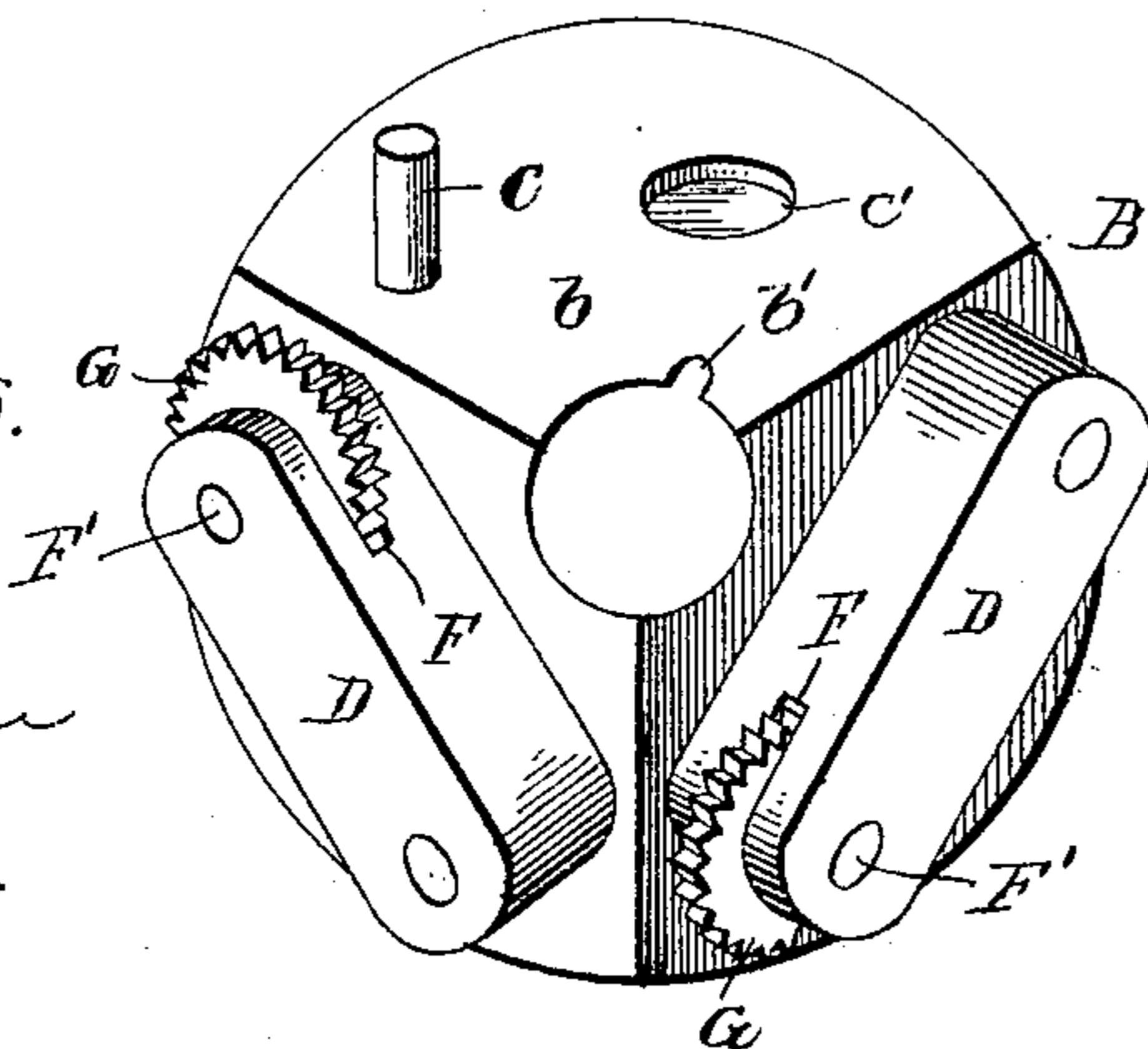


Fig. 6.



Witnesses.

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UNITED STATES PATENT OFFICE.

WILBER DAVID FORSYTH AND ENOS T. BELL, OF PITTSBURG, PENNSYLVANIA, ASSIGNORS TO THE UNION BOILER TUBE CLEANER COMPANY, OF SAME PLACE.

BOILER-TUBE CLEANER.

SPECIFICATION forming part of Letters Patent No. 605,951, dated June 21, 1898.

Application filed September 17, 1897. Serial No. 652,041. (No model.)

To all whom it may concern:

Be it known that we, WILBER DAVID FORSYTH and ENOS T. BELL, citizens of the United States, and residents of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Boiler-Tube Cleaners; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

Figure 1 of the drawings is a side view of an implement or machine embodying our invention. Fig. 2 is a medial longitudinal section of the same. Fig. 3 is a detail view of one of the cutter-carrying arms and its cutters. Fig. 4 is a detail view showing a modified form of same. Fig. 5 is a side view of one of the plates or carriers, and Fig. 6 is a plan view of the same with two of its cutter-carrying arms attached thereto.

This invention is designed to provide a device of improved character for cleaning the interior of pipes and tubes; and it consists in the novel construction and combination of parts, all as hereinafter described, and pointed out in the appended claims.

Referring to the accompanying drawings, the letter A designates a shaft, shaft-section, or hub. B designates a series of plates or cutter-carriers, which are secured to said shaft or hub to rotate therewith and which are of trihedral pyramidal form, the letter *b* designating the inclined plane faces thereof. Each of said plates or carriers has upon its forward face and well out toward its peripheral edge a number of pins or studs C, which are perpendicular to the said face and therefore oblique with respect to the shaft A, being outwardly inclined with respect thereto. D designates cutter-carrying arms, one of which is journaled to each of the said pins or studs C, and which are designed to swing outwardly in planes parallel with the planes of inclination of the faces of said plates. Each of said arms is slotted at its free end, as shown at F,

and has extending across such slot a pin or stud F', upon which is journaled one or more rolling cutters G, which preferably consist of small peripherally toothed or serrated disks or wheels, as shown. When more than one of these cutters is journaled to each arm, they may all be placed in the same slot, or the arm may have a number of separate parallel slots for the several cutters, the several cutters in this case being separated from each other by the intervening slot-walls *f*. The play of the arms upon the pins or studs C is limited by means of suitable stops, such as the pins or studs *c*, which engage slots or cavities *c'* in the plates or carriers B. Adjacent plates or carriers B are separated from each other by spaces or intervals of just sufficient extent to permit the free play of these arms, the rear faces of the plates being parallel with their forward-inclined faces, as shown. The rearmost plate or carrier, which need not be inclined except upon its forward face, is usually rigidly secured to the shaft or hub A, while the other plates are provided with keyways *b'*, which engage a spline *b''* of said shaft or hub, the series being held in place by a lock-nut consisting of a cone-shaped nose or guide H and a forward plate H', both of which are screwed upon the end portion of the shaft or hub and which have opposite threads. The rear face of the forward plate is coned out, as shown at *h*, to receive the adjacent series of arms. By this arrangement any plate or carrier, with its series of arms and cutters, can be readily removed from the shaft or hub for repairs or other purposes. We do not, however, desire to limit ourselves to any particular means for securing these plates to the hub or shaft, nor do we wish to limit ourselves to the use of any particular number of such plates. We prefer to provide each plate with three of the swinging arms, but may employ any other suitable number. The number of rolling cutters carried by each arm, whether one or more than one, depends upon the nature of the work.

The rear portion of the shaft may extend through a guide K, consisting of two or more spiders *k*, secured thereto and carrying a cylinder-shell, or said shaft may be directly con-

nected to or form the journal of a suitable
 motor immediately behind the cutting de-
 vices and designed to be pushed through the
 pipes or tubes therewith. This motor may
 5 be driven by steam, water, compressed air,
 electricity, or any other suitable power, or
 said shaft or hub may be connected to or form
 a part of either a rigid or a flexible driving-
 shaft driven from an external source of power.
 10 The manner of and means for driving the
 shaft or hub, however, form no part of the
 invention and need not be specifically de-
 scribed or illustrated herein, suitable means
 for the purpose being well known in the art.
 15 Constructed as above described the device
 is adapted for cleaning pipes and tubes of
 various kinds and is operated by introducing
 the nose of the cutter-head into the pipe or
 tube to be cleaned and forcing or pushing
 20 said head through the same under rapid ro-
 tation, the speed to be governed by the nature
 of the work. Under the force of rotation the
 arms D are thrown outwardly with their cut-
 ters against the scale or material to be re-
 25 moved. Inasmuch as these cutters come to
 their work at the angles determined by the
 degree of inclination of the cone-faces of the
 plates or carriers B we overcome any tend-
 ency which they might have to cut in certain
 30 lines or grooves, so as to form shoulders,
 against which they would catch to the im-
 pediment of the work and injury to the de-
 vice. This is an important feature of the in-
 vention. It will also be seen that owing to
 35 the rearward inclination of the faces of the
 plates B and the consequent rearward incli-
 nation of the cutter-carrying arms pivoted
 thereto the latter, with their cutters, instead
 of being forced or pushed through the tube
 40 are in a measure "dragged" through, and
 consequently are enabled to more readily pass
 any obstruction or shoulder which they may
 encounter; also, that as the cutter-carrying
 arms move outwardly on the inclined bear-
 45 ing and guiding faces of the plates they move
 backward or lengthwise in the tube with re-
 lation to the work, which gives them a better
 clearance and results in a better action and
 more efficient work. A small stream of wa-
 50 ter should be kept flowing through the pipe
 or tube to prevent clogging and undue heat-
 ing of the cutters.

Having thus described our invention, what
 we claim as new, and desire to secure by Let-
 55 ters Patent, is—

1. In a pipe or tube cleaner, the combina-
 tion with a plate or carrier having a rear-
 wardly-inclined face, of a cutter-carrying arm
 pivoted to the said face to move in a plane
 60 parallel with the plane of inclination of said
 face, and one or more rotary cutters journaled
 to the free end portion of the said arm, sub-
 stantially as specified.

2. In a pipe or tube cleaner, the combina-
 tion with a plate or carrier having a rear- 65
 wardly-inclined face, and a pin or stud pro-
 jecting perpendicularly therefrom, of an arm
 pivoted to the said stud to move in a plane
 parallel with the plane of inclination of the
 said face, and one or more cutter-wheels jour- 70
 naled to the free end portion of the said arm
 and working in a plane or planes parallel with
 the plane of movement of the said arms, sub-
 stantially as specified.

3. In a pipe or tube cleaning device, the 75
 combination with a shaft or hub, of a plate
 or carrier secured thereto and adapted to be
 moved through and rotated within the pipe
 or tube to be cleaned, said plate or carrier
 having an inclined face, a number of arms 80
 pivoted to the said plate or carrier upon its
 inclined face and capable of swinging out-
 wardly in planes parallel with the plane of
 the inclination of the face to which they are
 pivoted, stops for limiting the movement of 85
 the said arms, and one or more toothed cut-
 ters journaled to the free end portion of each
 of the said arms, substantially as specified.

4. In a pipe or tube cleaning device, the
 combination with a suitable shaft or hub, of 90
 a number of pyramidal plates or carrying de-
 vices secured thereto at intervals and having
 parallel front and rear faces, one or more
 arms pivoted eccentrically to each of said
 plates or carriers and arranged to swing out- 95
 wardly in planes parallel with the planes of
 the inclination of the said faces, and one or
 more rolling cutters journaled to the free end
 portion of each of the said arms, substantially
 as specified. 100

5. In a pipe or tube cleaning device, a py-
 ramidal carrier-plate whose plane outer or
 forward faces are inclined rearwardly, a stud
 projecting perpendicularly from each of the
 said faces, and a cutter-carrying arm pivoted 105
 to each of the said studs to move in a plane
 parallel with the plane of the face which car-
 ries the stud, substantially as specified.

6. In a pipe or tube cleaning device, a shaft,
 a number of trihedral pyramidal plates se- 110
 cured thereto at short intervals from each
 other, cutter-carrying arms pivoted to the in-
 clined faces of said plates to swing outwardly
 and rearwardly in the planes thereof, and
 cutters journaled to the free end portions of 115
 the said arms, the rear faces of the plates ad-
 jacent to said arms being of concave pyrami-
 dal form, substantially as specified.

In testimony whereof we affix our signa-
 tures in presence of two witnesses.

WILBER DAVID FORSYTH.
 ENOS T. BELL.

Witnesses:

S. A. MYERS,
 M. L. THOMPSON.