

No. 607,169.

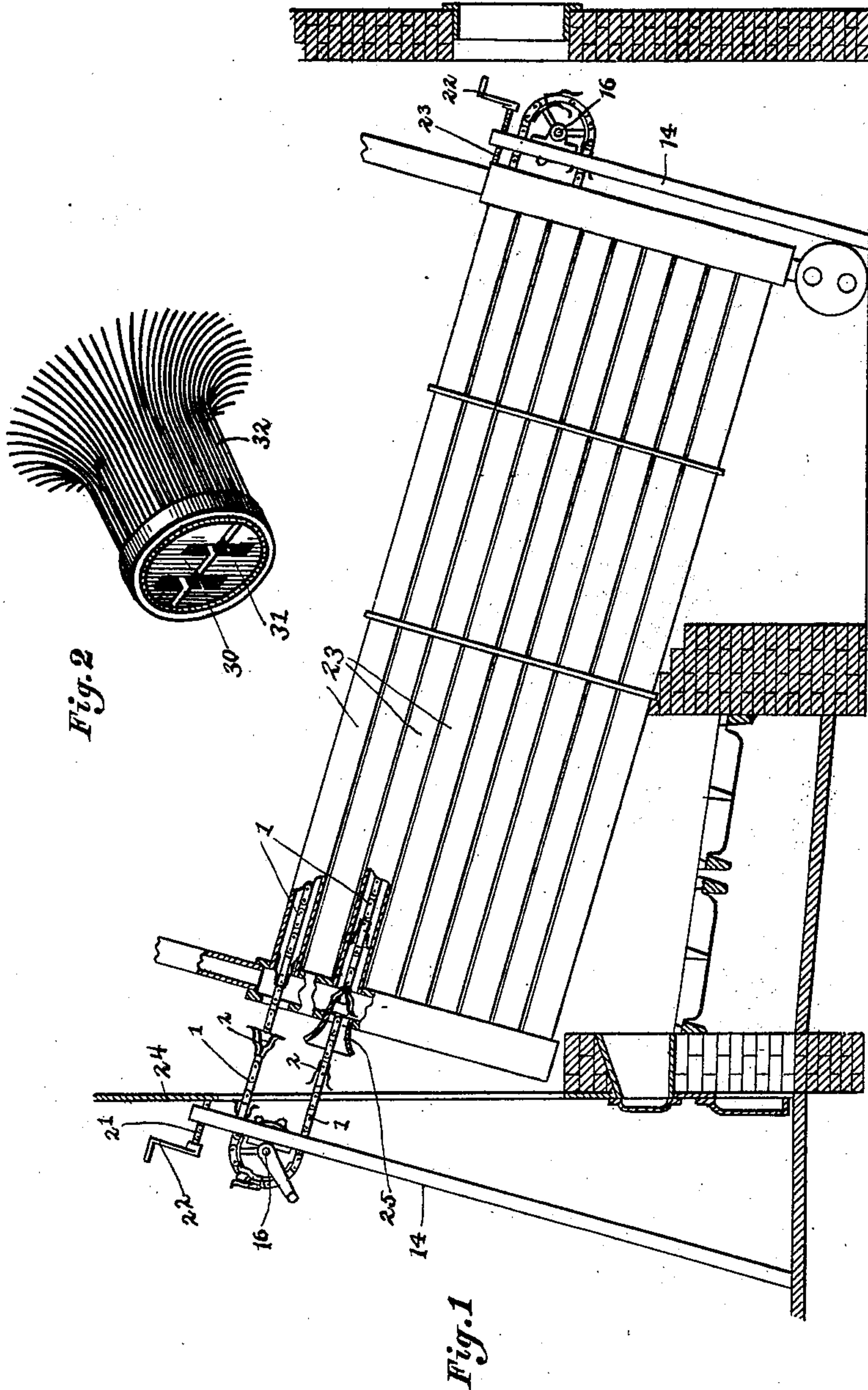
Patented July 12, 1898.

E. F. GWYNN.
BOILER TUBE CLEANER.

(Application filed Nov. 19, 1897.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES:

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2 Sheets—Sheet 2.

Fig. 3

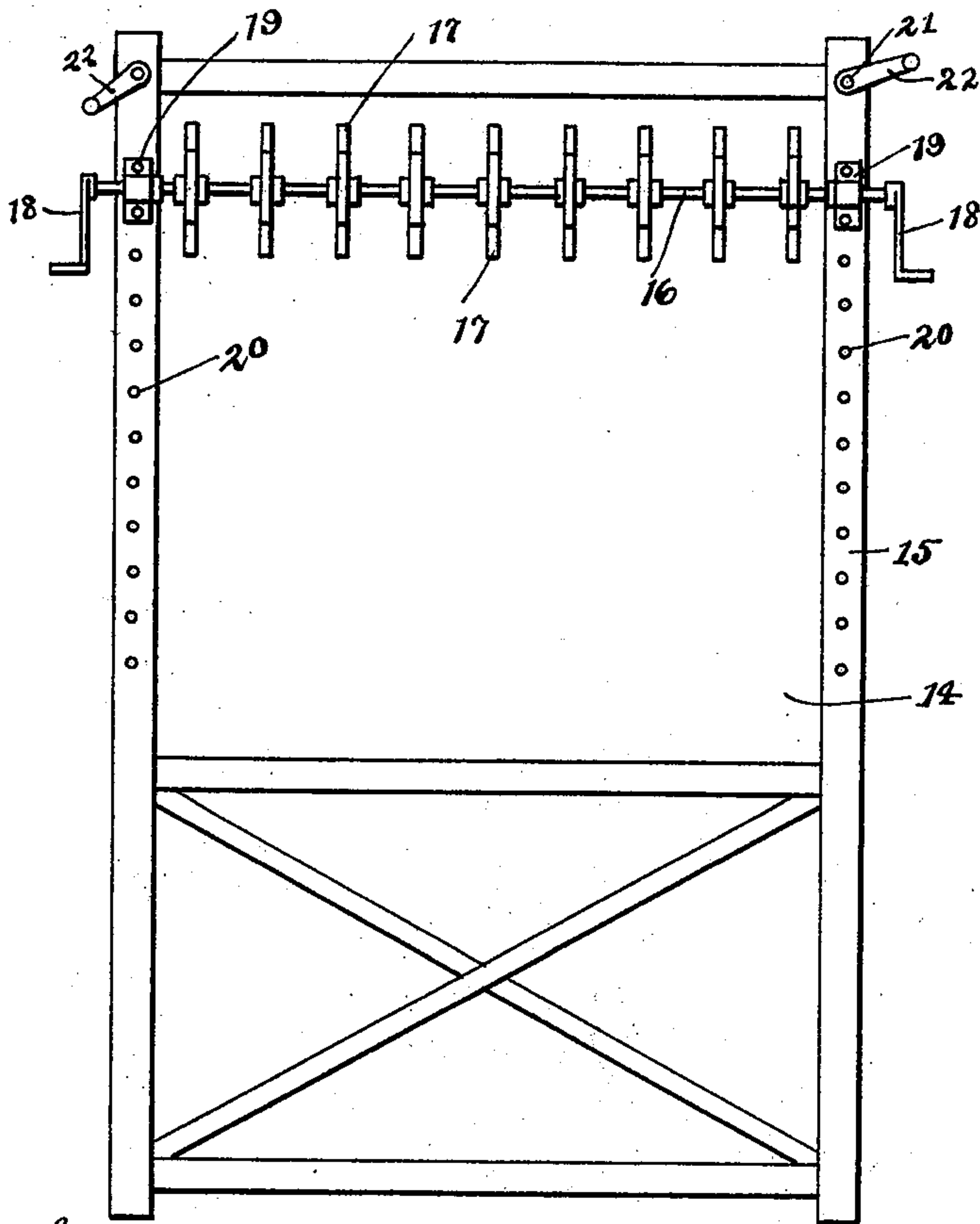


Fig. 4

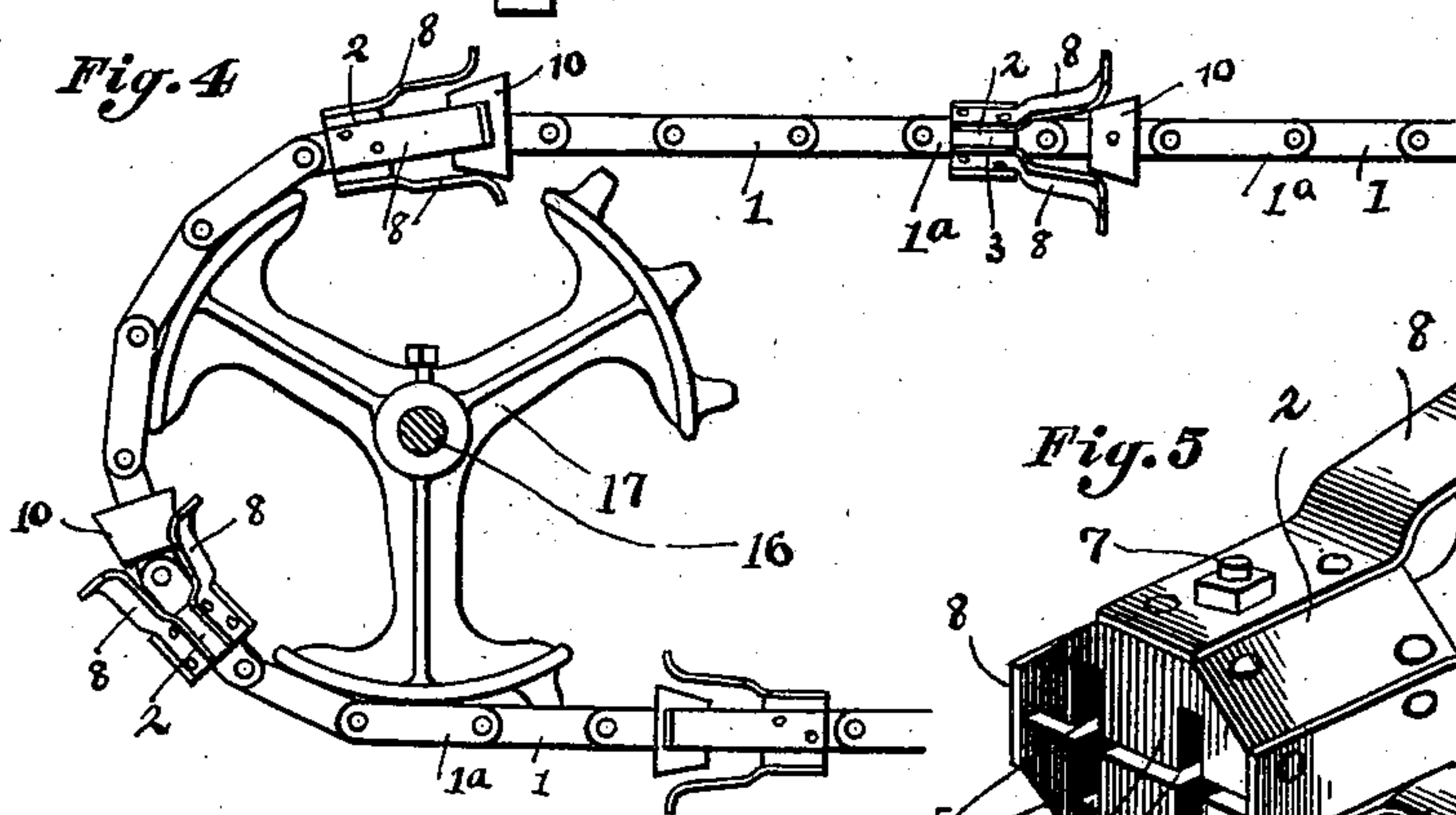
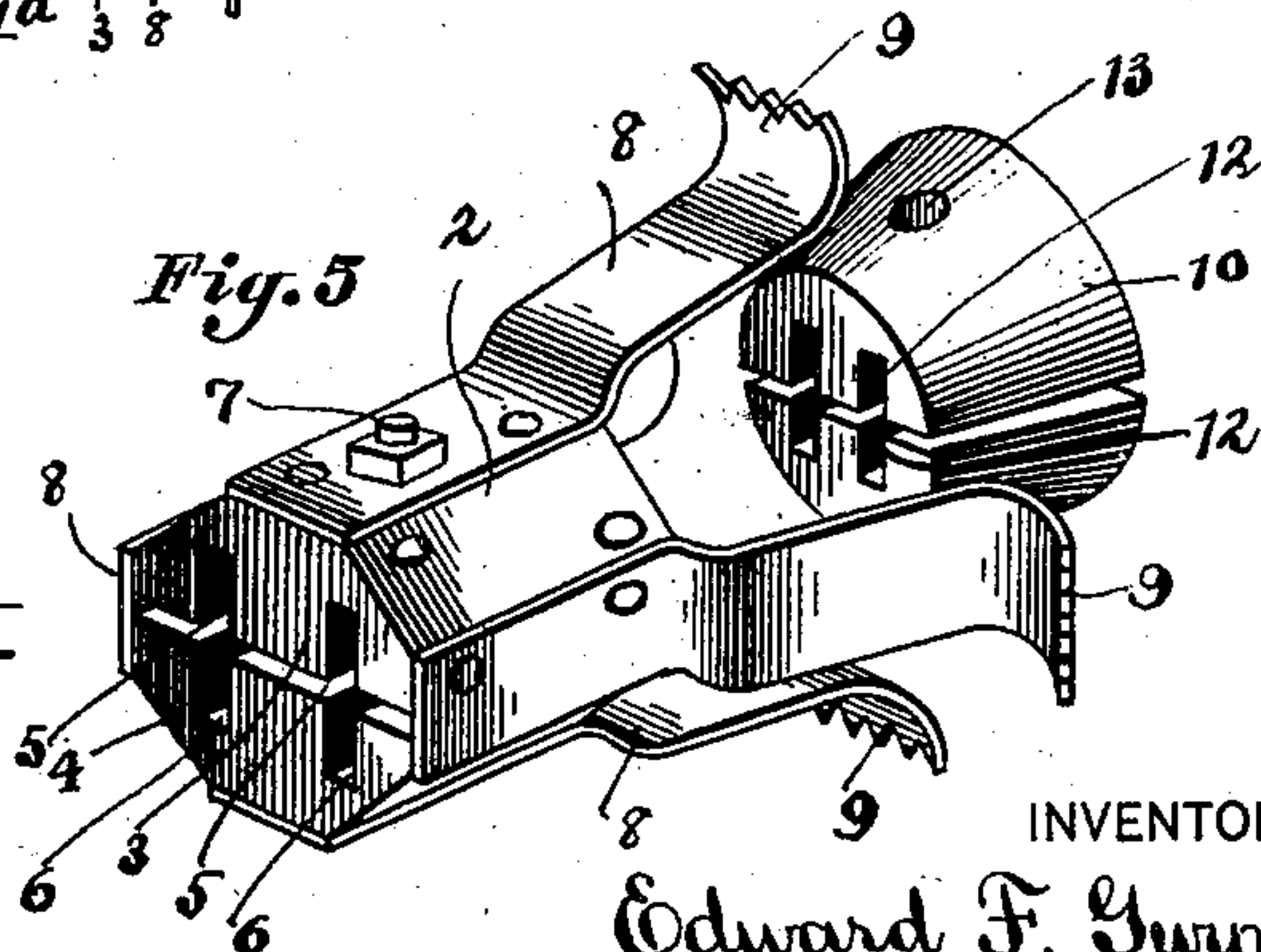


Fig. 5



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BOILER-TUBE CLEANER.

SPECIFICATION forming part of Letters Patent No. 607,169, dated July 12, 1898.

Application filed November 19, 1897. Serial No. 659,138. (No model.)

To all whom it may concern:

Be it known that I, EDWARD F. GWYNN, a citizen of the United States, residing at Delaware, in the county of Delaware and State of Ohio, have invented a certain new and useful Improvement in Boiler-Tube Cleaners, of which the following is a specification.

My invention relates to boiler-flue-cleaning devices, and has particular relation to devices for cleaning what are known as "water-tube" boilers.

The objects of my invention are to provide an improved mechanism whereby scale or other deposits on the inner surface of boiler-tubes may be readily and effectively removed, to so construct and arrange the parts of my device as to admit of its use on curved or straight boiler-tubes, and to otherwise produce a simple, reliable, and effective cleaning mechanism for boiler-tubes which may be readily adapted for use. These objects I accomplish in the manner illustrated in the accompanying drawings, in which—

Figure 1 is a view, partially in section and partially in elevation, of a tubular boiler, showing my device in use thereon. Fig. 2 is a detail view in perspective of a modified form of cleaner which I may employ in the manner hereinafter described. Fig. 3 is a view in elevation of one of the cleaner-supporting frames, on which the operating-shaft is mounted in the manner to be described. Fig. 4 is a detail side elevation of a portion of one of the cleaner-carrying chains and a segmental sprocket over which the same runs, and Fig. 5 is a detail view in perspective of one of the cleaning or scraping devices which is carried by the chain shown in Fig. 4 and adjacent to which is shown the scraper-spreading device in an operating position.

Similar numerals refer to similar parts throughout the several views.

In carrying out my invention I employ an endless chain 1, which is provided at suitable intervals with scraping devices 2 of improved construction. The construction of and manner of attaching the said scraping devices to the links of the chain 1 are shown more clearly in Figs. 4 and 5 of the drawings, this construction and operation being substantially as follows: In producing each of the scraping

devices I provide a scraper-supporting block which is formed of opposing sections 3 and 4, said sections uniting in producing said block of an octagonal form in cross-section. One of said sections, which I will call the "upper" section 3, is provided on its under side with longitudinal and parallel recesses or grooves 5, while the upper side of the lower section 4 is provided with similar and oppositely-located recesses or grooves 6. In uniting the sectional scraper-carrying blocks formed as above described with the side bars 1^a of a chain-link said link side bars are embraced partially by the recesses 5 of the upper section and partially by the recesses 6 of the lower section, a bolt 7, which passes through said sections, being adapted to detachably connect the sectional block with the link. As indicated in the drawings, I employ scraping-fingers 8, which are in the form of metallic strips, the shank portions of which are united to the desired faces of the block-sections 3 and 4, while the outwardly-extending end portions of said strips are so bent as to flare outwardly from their shanks, the substantially hook-shaped ends of each of said strips preferably being toothed, as indicated at 9.

By reference to Figs. 4 and 5 of the drawings it will be seen that four of the scraping-strips 8 are preferably employed in connection with each of the supporting-blocks. In said Fig. 5 these strips are shown as connected with the extreme upper and lower and outer sides of the block-sections; but, as indicated in Fig. 5, the strips of each alternate block on the chain are secured to the four inclined faces of the block, thus causing the toothed ends of the scraping strips or fingers of one block to project in paths between those occupied by the scraping strips or fingers of the next succeeding block.

10 represents a sectional spreading or scraping-finger adjusting-block the united sections of which have the form of a truncated cone. As prescribed for the block-sections 3 and 4, the upper and lower sections of the spreading-block 10 are provided, respectively, on their under and upper sides with parallel recesses or grooves 12, which are adapted to embrace the side bars of that chain-link on

which is mounted one of the blocks 2, said spreading-block sections being adapted to be united by a bolt which passes through oppositely-located openings 13 therein. The sectional block 10 is adapted to be so supported on its link as to admit of its end toward which its sides taper being forced between the outer end portions of the scraping-strips of the adjacent block 2 in the manner partially illustrated in Figs. 4 and 5 of the drawings.

It is evident that the sets of blocks 2 and 10 may be arranged at desirable intervals on the chain 1.

In order to utilize the scraping-chain, formed as hereinbefore described, I provide two upright frames 14, between the vertical standards 15 of each of which I journal a transverse shaft 16, the latter carrying at desirable intervals thereon broken or segmental sprocket-wheels 17. The outer ends of the shaft 16 may be provided with cranks 18 or may be provided with belt-wheels for power rotation, if desired. In mounting the shaft 16 in connection with the frame 14 I employ journal-boxes 19, which, owing to the formation of vertical rows of bolt-holes 20 in the frame-standards 15, may be secured at desirable heights on said standards. Through a screw-threaded opening in the upper end portion of each of the frame-standards 15 passes a screw-rod 21, the latter being provided on its outer end with a suitable handle 22.

As indicated in Fig. 1 of the drawings, one of the frames 14 is in practice supported in front of the boiler-flues, the latter being indicated at 23, while another of the frames 14 is supported opposite the rear ends of said flues. The front frame 14 may, as shown in said Fig. 1, be made to incline or lean toward the front frame-plate 24 of the boiler, the end of the screw-rod 21 coming into contact with said frame-plate and the rear screw-rod 21 being in a like manner in contact with the rear end portion of the boiler at a desirable point. The endless cleaner carrying chains, constructed as described, are made to pass over corresponding sprocket-wheels 17 in the front and rear frames 14, the arms of each of said chains passing, respectively, through adjacent tubes 23. It is obvious that the arms of the chains may be tightened by drawing inward the screws 21 to force the frames 14 outward. Although it is obvious that a number of endless chains 1 may be employed which is equal to the number of sprocket-wheels 17 on the shaft 16 or equal to the number of boiler-tubes employed in each horizontal row, I will describe the manner of inserting and utilizing the chain 1. (Indicated in Fig. 1 of the drawings.) Before inserting the chain into one of the tubes—such, for instance, as the next to the highest tube shown in Fig. 1—the usual boiler-tube cap is removed and into the opening thus provided is inserted a bowl or funnel-shaped guide 25. The chain, first having two of its links disconnected at a desirable point is

drawn inward, in the direction of the arrow in Fig. 1, through the flaring guide 25, thence through the tube, and out at the opposite end of the latter. The chain now being passed over a sprocket-wheel of the rear shaft 15 is by the employment of another of the guides 25 made to enter the upper tube 23 at the rear end thereof. Having been passed through this upper tube, said chain is passed about one of the sprocket-wheels 17 of the front shaft 16, after which the disconnected links may be again united to result in the formation of the endless chain.

It will be observed by reference to Fig. 4 that the segments of the sprocket-wheels are at such distance one from the other as to result in the production of spaces or pockets for the reception of the blocks 2 and their fingers while the chain is passing over said wheels. Rotary motion being contributed by suitable power to the sprocket-carrying shafts 16, it is obvious that a traveling motion of the chain through two of the tubes will be accomplished and that the outwardly-sprung scraping and toothed fingers of the blocks 2 will by contact with the interior surface of the tubes or the scale thereon operate to remove said scale or other accumulated deposits. By so arranging the scraping-fingers of one of the blocks as to cause their ends to travel in paths not followed by the fingers of the next succeeding block it is obvious that the greater portion of the internal surface of the tubes will be subjected to the scraping operation during the traveling movement of the chain above described.

In case it is found necessary to spread the fingers 8 to a greater degree the bolt which holds the spreading-block 10 to the adjoining chain-link may be loosened sufficiently to admit of said spreading-block being forced farther in between the flaring fingers of the adjoining block.

From the construction and operation which I have described it will not only be seen that the interior surface of parallel boiler-tubes may be effectively cleaned, but that the endless chain above described may be made to pass through and clean boiler-tubes having curved end connections. It will also be seen that a number of tubes may be cleaned at one time and that, the upper tubes being cleaned in the manner hereinbefore described, a change in the position of the shaft-boxes on the standard 15 will result in supporting the chains in position for cleaning the lower tubes.

As indicated in Fig. 2 of the drawings, I may substitute for the cleaners 2, hereinbefore described, a brush cleaner, the latter consisting of a suitable brush-holding block formed of sections 30 and 31, said sections being adapted to be united to the side bars of a chain-link in the manner described for the sections 3 and 4. With each of the sections 30 and 31 are suitably-connected outwardly-extending metallic brush-bristles 32, the flaring or outturned ends of which may

be made to engage with and cause a detachment of the scale from the inner surfaces of the boiler-tubes.

From the construction and operation described it will be seen that my improved boiler-cleaning mechanism may be readily applied to any of the ordinary forms of water-tube boilers and that when rotary power has been applied to the sprocket-wheel shafts the cleaning of the interior of said tubes will be readily accomplished.

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

1. In a boiler-tube-cleaning mechanism, the combination with an endless chain adapted to pass through adjacent boiler-tubes and suitably-mounted segmental sprocket-wheels at opposite ends of said boiler-tubes over which said chain passes, of cleaning devices consisting of upper and lower block-sections 3 and 4 recessed to embrace the side arms of chain-links, means for detachably connecting said block-sections with said links and scrap-

ing-strips having their shanks secured to said block-sections and having their outturned ends toothed, substantially as and for the purpose specified.

2. In a boiler-tube cleaner, the combination with an endless chain adapted to pass through adjacent boiler-tubes, suitably-mounted segmental sprocket-wheels at opposite ends of said boiler-tubes over which said chain passes, of cleaning devices consisting of blocks detachably connected with links of said chain, scraping-strips having their shanks secured to said blocks and having outwardly-bent scraper ends, and conical spreading-blocks detachably and adjustably connected with the links of said chain and adapted to spread said scraping-strips by being forced between the latter, substantially as and for the purpose specified.

EDWARD F. GWYNN.

In presence of—

F. A. OWEN,
E. S. OWEN.