No. 778,293. PATENTED DEC. 27, 1904.

G. WIEDEKE.

TUBE CUTTER.

APPLICATION FILED JULY 20, 1904.

3 SHEETS—SHEET 1.

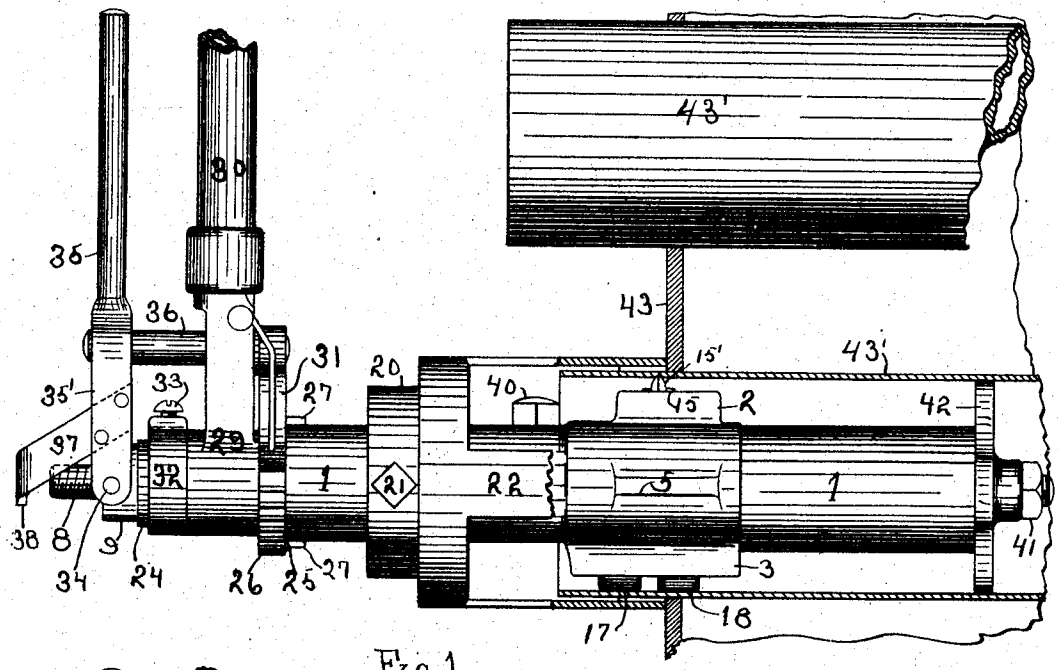


Fig. 1.

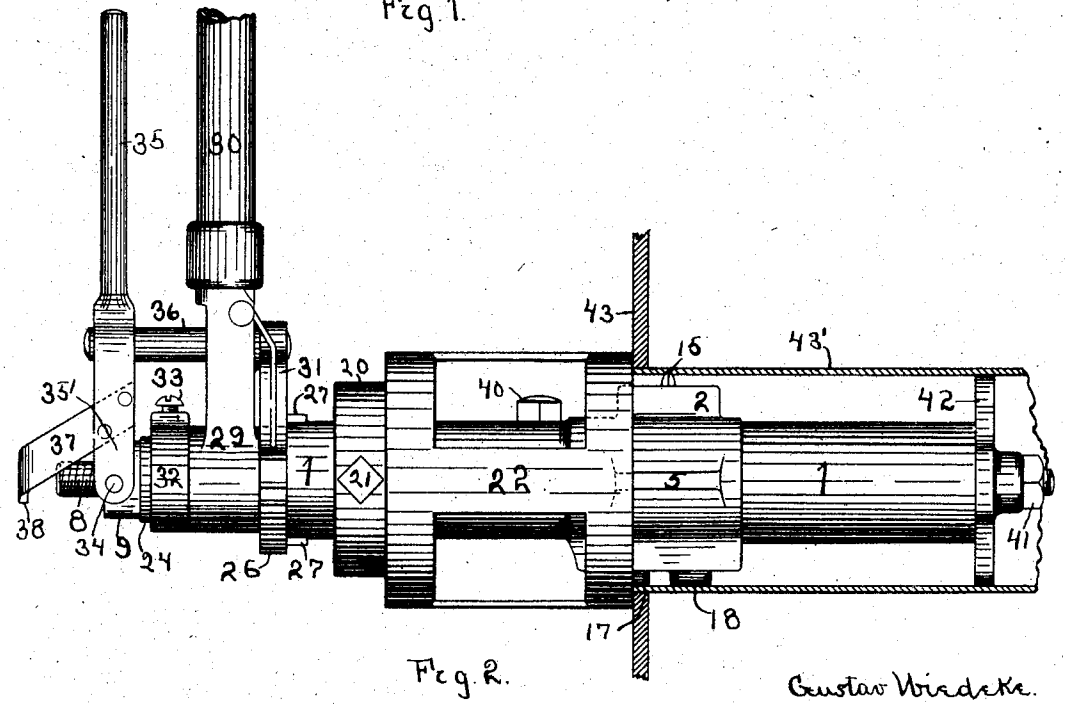


Fig. 2.

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Fig. 3.

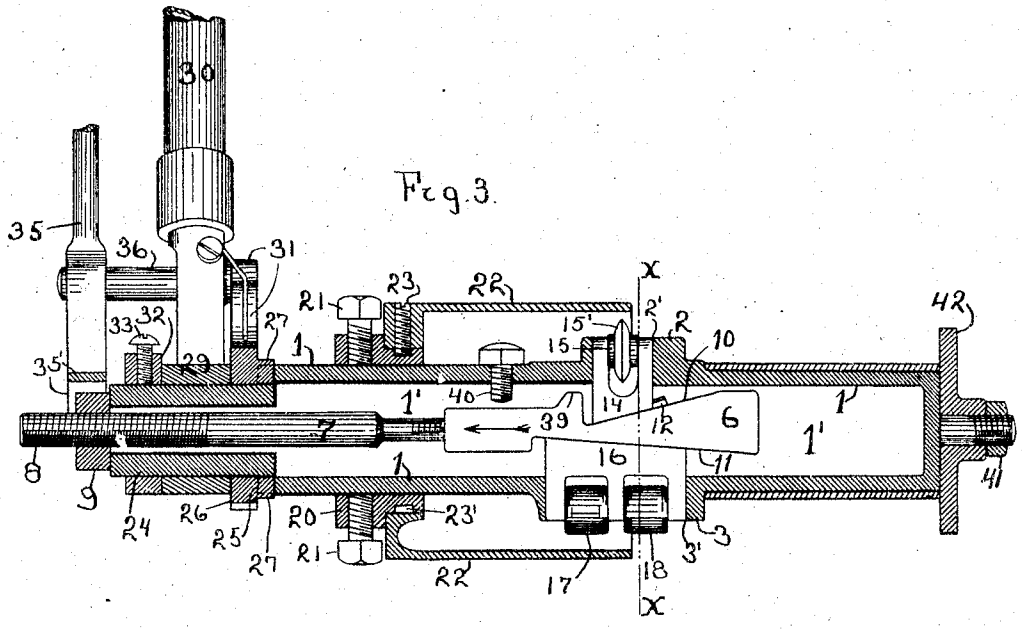
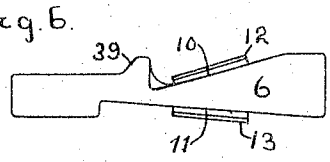


Fig. 6.



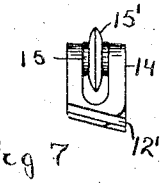


Fig 7

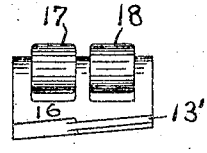


Fig. 8.

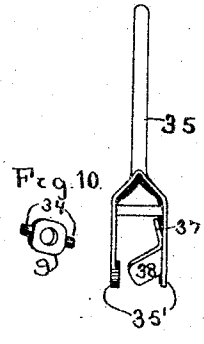


Fig. 10.

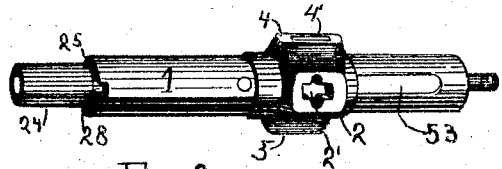


Fig. 9.

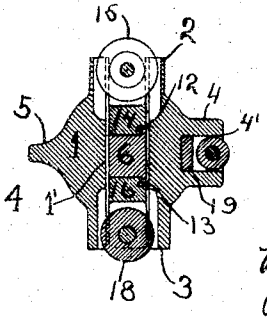


Fig. 4

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3 SHEETS—SHEET 3.

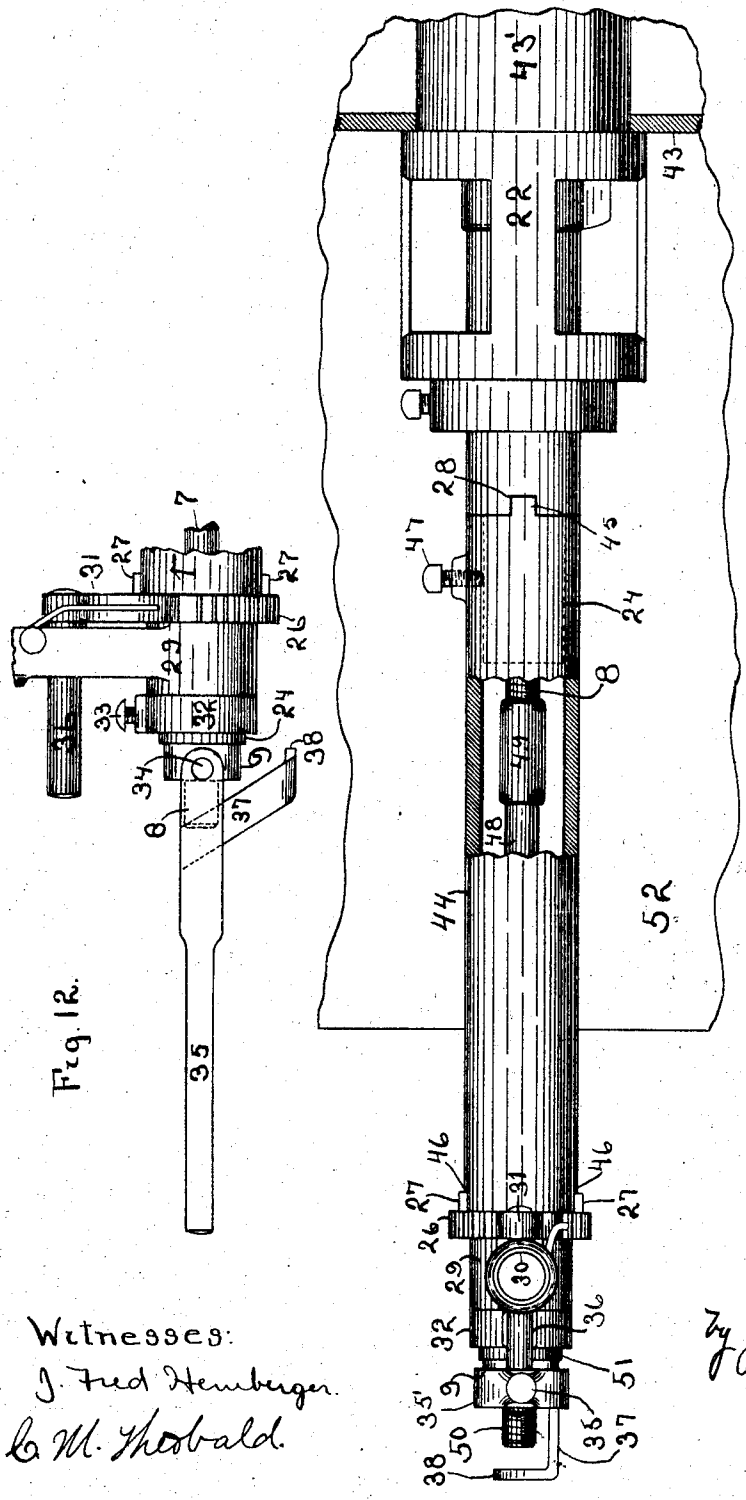


Fig. 12.

Fig. 5.

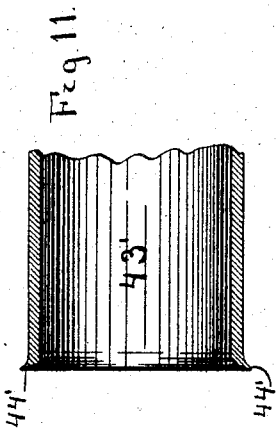


Fig. 11.

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No. 778,293. Patented December 27, 1904.

UNITED STATES PATENT OFFICE.

GUSTAV WIEDEKE, OF DAYTON, OHIO.

TUBE-CUTTER.

SPECIFICATION forming part of Letters Patent No. 778,293, dated December 27, 1904.

Application filed July 20, 1904. Serial No. 217,308.

To all whom it may concern:

Be it known that I, GUSTAV WIEDEKE, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Tube-Cutters; and I 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 the figures of reference marked thereon, which form a part of this specification.

This invention relates to new and useful improvements in tube-cutters for boiler manufacturers.

Among the points of utility and advantage, as hereinafter described and claimed, are the following:

The invention provides a tube-cutter which feeds automatically. It also provides means for cutting off the tubes of boilers either inside or outside the boiler-head at any desired distance from the head. In the making of new boilers after the tubes are cut off the ends are then beaded or hammered down against the boiler-head. This necessitates much hammering and in many cases causes the tubes to crack.

The present invention provides means by which the tubes are cut off with a bevel and the ends slightly rolled back ready for beading.

The invention further provides means for attaching an extension to the tool, by means of which the cutter can be used in cutting tubes of boilers where the boiler-head is some distance inside the shell, as in locomotives, &c. This extension of the cutter allows the person handling the instrument to stand upright outside the shell of the boiler, while formerly it was necessary to work in a cramped position inside the shell. This of course is a great advantage in time and labor-saving.

Preceding a detail description of the invention, reference is made to the accompanying drawings, of which—

Figure 1 is a view of the cutter employed in cutting a tube outside the boiler-head. Fig. 2 is a similar view of the cutter cutting inside the boiler-head. Fig. 3 is a longitudinal section of the cutter. Fig. 4 is a section on the line x x of Fig. 3. Fig. 5 is a view of the cutter and extension device. Fig. 6 is a detail of the feed-wedge. Fig. 7 is a detail of the cutting-blade and frame or carrier. Fig. 8 is a view of the double roller and carrier. Fig. 9 is a perspective view of the frame of the cutter. Fig. 10 is a detail of the feed-handle and feed-nut. Fig. 11 shows a tube as cut by the improved cutter. Fig. 12 shows the feed-handle in a position to be operated by hand.

Throughout the specification similar reference characters indicate corresponding parts.

1 designates the frame of the cutter, being hollow, as shown in Fig. 3. 2, 3, 4, and 5 designate bearing-bosses projecting from said frame. Bosses 2 and 3 contain openings 2′ and 3′, which communicate with the interior 1′ of the frame. On the interior 1′ of the frame is a feed-wedge 6, having connected at one end a rod 7. Rod 7 has screw-threads 8 at one end, which passes outside of the frame 1 and upon which is a nut 9. Wedge 6 has an abrupt taper 10 and a gentle taper 11 on opposite sides. Along the tapered sides of the wedge are retaining projections 12 and 13. Engaging projection 12, with a corresponding groove 12′, and resting on taper 10 is a carrier 14. Carrier 14 projects through opening 2′ in boss 2 and has journaled in its upper end a cutting blade or wheel 15. Engaging projection 13, with a corresponding groove 13′, and resting on the gentle taper 11 is a carrier 16, said carrier projecting through opening 3′ in boss 3, and has journaled in the upper end two rollers 17 and 18. Boss 4 also has an opening 4′, in which rests a roller and its frame or carrier 19. Passing around frame 1 is a guard 20, having set-screws 21, by means of which it may be fastened at any point. Connected to said guard-ring 20 by means of a screw 23 passing into a circumferential groove 23′ is a guard 22. In the operation of the cutter the guard 22 is always held firmly against the boiler-head by set-screws 21.

The rear end of the frame 1 is of smaller diameter than the rest of the frame, as at 24. This difference of diameter forms a shoulder

25 on said frame. Supported around the rear end 24 and adjacent to shoulder 25 is a ratchet 26. Lugs 27 on ratchet 26 fit openings or recesses 28 on frame 1 to unite them, and any movement of the ratchet 26 is imparted to the frame 1. Adjacent to the ratchet 26 on end 24 is a ratchet-handle 29, having a pipe extension-handle 30. Ratchet-handle 29 carries a pawl 31, which engages ratchet 26. Lying adjacent to ratchet-handle 29 is a slip-collar 32, which is tightly fastened to the end 24 by a screw 33 to hold the above-described mechanism in place. Nut 9 has two projecting pins 34, which act as a support for feed-handle 35. The said handle has two prongs 35′, which pass on either side of the nut 9 and are held by pins 34. Passing between these prongs near the point of convergence is a pin 36, which is a part of ratchet-handle 29 and which imparts any movement of the ratchet-handle 29 to the feed-handle 35. Projecting at right angles from one of the prongs 35′ is a bar 37, having its extreme outer end 38 bent at right angles to its length. The bent end passes across the path of rod 7 and prevents any further movement of the rod when the end of said rod reaches the stop end 38. It will be observed that the feed-wedge 6 has a boss or projection 39. Lying in the path of said boss is a screw 40, projecting through frame 1. Screw 40 performs the same function as stop 38 by engaging projection 39 to stop any further outward movement of the wedge 6. At the front of the frame 1 and held thereto by a nut 41 is a centering-guide 42. Said guide tends to keep the cutter in one position throughout the cutting operation. I will now describe a feature of the device which enables the cutting off of tubes in boilers where the head is some distance inside the shell, as in locomotive-boilers, &c. Reference is made to Fig. 5 throughout this description.

44 designates an extension-frame having on one end lugs or projections 45 and on the other end recesses 46. Said extension is hollow throughout its length and has a smaller diameter at one end, 51. 47 designates a set-screw in said frame.

48 designates an extension feed-rod having at one end a sleeve-coupling 49. The other end is threaded, as at 50.

To use the extension, it is necessary to loosen screw 33 of slip-collar 32 and remove said slip-collar, together with the ratchet 26 and ratchet-handle 29, from the rear end 24 of frame 1. Extension-rod 48 is then screwed to rod 7 by coupling 49, and extension-frame 44 is attached on the rear end 24 of the main frame 1 with lugs 45 engaging recesses 28 of said main frame. Set-screw 47 is then tightened. The object of these lugs and set-screw is to firmly unite the extension to the main frame. On the smaller end 51 on extension 44 the ratchet 26 is put with its lugs 27 engaging recesses 46. The ratchet-handle 29, slip-collar 32, feed-nut 9, and handle 35 are then put on in the order named and adjusted. The instrument is now ready for use, and, as shown in Fig. 5, the operator can stand upright while cutting off tubes a distance inside the shell 52. These extensions are made in various lengths, suiting various demands or conditions.

In removing the cutting and roller frames from their bearings in openings 2′ and 3′ in bosses 2 and 3 the screw 40 is removed from the path of boss or projection 39 of wedge 6. The wedge is then drawn in the direction indicated by the arrow (see Fig. 3) until the frames or carriers 14 and 16 are released from the wedge 6 by passing out of engagement with the projections 12 and 13. They then can be lifted from the frame 1.

Referring to Fig. 9, 53 designates an opening in frame 1, said opening being used in removing the wedge 6 from the interior of said frame.

Having described the various details of the mechanism, I will now briefly detail the operation of the cutter.

The forward centering-guide is placed into the tube, and the whole is then pushed in until the guard 22 engages the boiler-head 43. The guard-ring has been previously set to cause the blade 15 to cut at the desired point. Fig. 1 shows the blade cutting one-eighth of an inch on the outside of the head 43, which is the usual distance to allow for beading the tubes. The feed-handle 36 is then moved outward and away from engagement with pin 36, as shown in Fig. 12, and the feed-nut 9 is turned to feed out the cutter 15 and the roller-bearing 16 to engage the tube 43′. Feed-handle 35 is then returned to the position ready to automatically feed, as shown in the various views, and the cutter is ready for operation. The handle 30 is then grasped, and by pulling the handle toward the operator or from left to right (the operator standing to the right of the cutter) the pawl 31 engages ratchet 26, thus moving the frame and all mechanism thereon, and thereby starting the cutting. Moving the handle away from the operator, or from right to left, the pawl rides over the ratchet, the frame and mechanism thereon being at rest, but the feed-handle operating the nut 9 to draw the wedge in the direction of the arrow (see Fig. 3) and feeds outwardly the cutting-blade 15 and the rollers 17 and 18. These movements are continued until the feed-rod 7 reaches the stop 38, at which time the cutting-blade 15 has severed the tube. It will be observed in Fig. 1 that during the operation of cutting a tube outside the boiler-head the front roller 18 acts as the chief bearing-roller. To cut a tube inside the boiler-head, as is necessary in removing the old tube from boilers, the following changes only are necessary: Set-screws 21 are loosened and the ring 20 and guard 22 are moved

nearer the ratchet the desired amount to cause the cutting-blade 15 to lie inside the head 43 when the guard 22 is against said head. The operation as above described is then repeated.

From Fig. 2 it will be seen that during the cutting operations inside the boiler-head roller 17 acts as a bearing. It will also be noticed in the various views of the cutting blade or wheel that the cutting edge is not a straight bevel, but is convexly curved, as indicated by 15′. There is always a roller acting as a chief bearing at the point of cutting, and since these rollers are continuously exerting an outward rolling pressure as they are being gradually and continuously fed outwardly, and owing to the peculiar shape of the cutting-surface of the cutting-blades the tube when severed has an outwardly-rolled flange 44′ ready for beading, as shown in Fig. 11. This point is of a great importance, as it decreases the amount of hammering and greatly facilitates the beading of the tubes, and thus lessens the possibility of cracking to a minimum. At this point there also will be seen the great advantage of the two rollers 17 and 18, which enable a cut to be made either outside or inside the boiler-head with but little change of the instrument.

Having described my invention, I claim—

1. In a tube-cutter, a main frame, a ratchet detachably connected thereto, a detachable operating-handle, a wedge having two tapered surfaces, a frame or carrier with a cutting-wheel slidingly engaging one of said tapered surfaces, a frame or carrier with two roller-bearings slidingly engaging the other of said tapered surfaces, a rod connected to said wedge, a nut riding upon the threaded end of said rod, a feed-handle attached thereto, and means interposed between said operating-handle and said feed-handle to actuate the feed-handle to feed outwardly the cutting-blade and rollers, substantially as set forth.

2. In a tube-cutter, a main frame, a feed-wedge having two tapered surfaces, a cutting-blade and roller adapted to be outwardly fed by said wedge, a feed-rod having its outer end screw-threaded, a nut, a feed-handle attached thereto, and a stop projecting from said handle adapted to engage said feed-rod when the outward feeding of the cutter and rollers has been sufficient to sever the tube.

3. In a tube-cutter, a main frame having a longitudinal opening therein, a feed-wedge contained therein, a cutting-wheel and rollers, means for moving said wedge to feed said cutting-wheel and rollers, a stop-screw in said main frame, a projecting stop on said wedge adapted to be engaged by said stop-screw to limit the outward movement thereof, substantially as set forth.

4. In a tube-cutter, a main frame, cutting and rolling devices, a wedge for outwardly feeding said devices, a main feed-rod connected to said wedge, an extension-frame adapted to fit said main frame, an extension feed-rod adapted to fit said main feed-rod, said main frame and feed-rod being adapted to receive the operating and feeding devices, substantially as set forth.

5. In a tube-cutter, a supporting-frame, a feed-wedge, a cutter and roller fed outwardly by said wedge, a feed-rod controlling said wedge, a feed-handle, and means on said feed-rod engaged by the handle for imparting feed movements thereto.

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

GUSTAV WIEDEKE.

Witnesses:
J. FRED HEMBERGER,
CAROLYN M. THEOBALD.