A. P. KOHLER.

ROLLER TUBE CUTTER.

APPLICATION FILED FEB. 28, 1908.

910,547. Patented Jan. 26, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

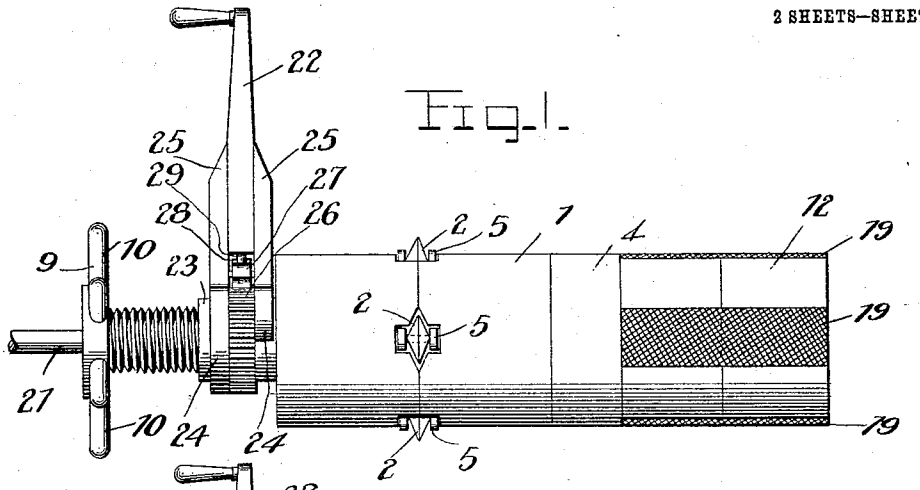


Fig. 2.

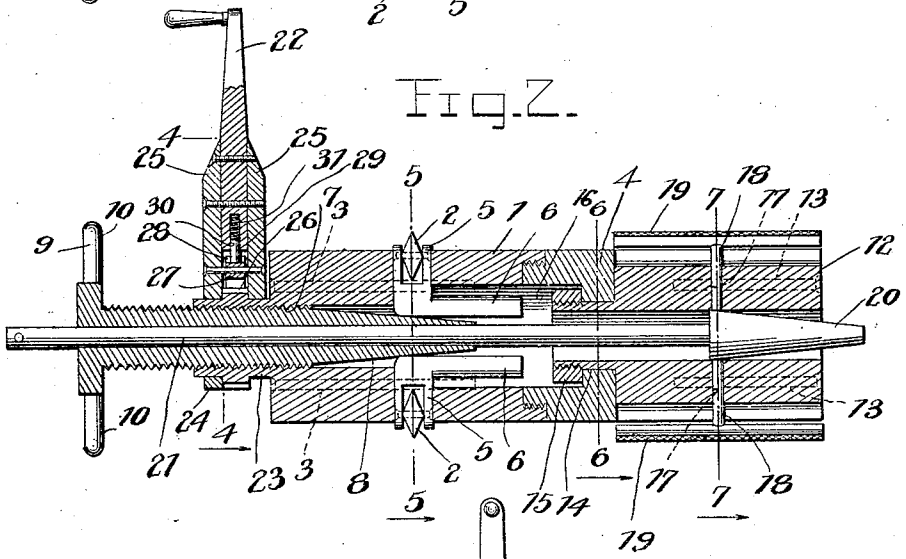
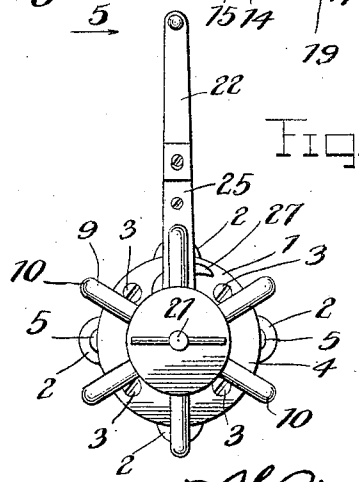


Fig. 3.



Witnesses

W. A. Rockwell

C. H. Griesbauer.

Inventor

A. P. Kohler

By A. B. Williamson & Co

Attorneys

THE NORRIS PETERS CO., WASHINGTON, D. C.

A. P. KOHLER.

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2 SHEETS—SHEET 2.

Fig. 4.

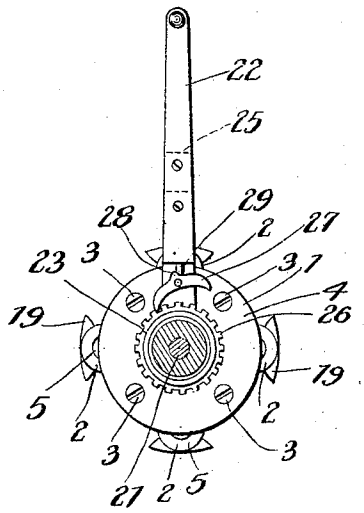


Fig. 5.

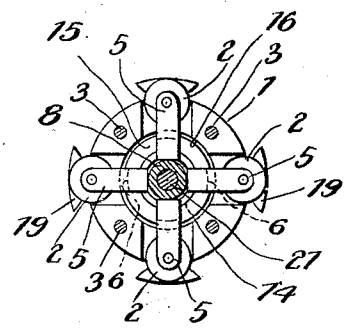


Fig. 6.

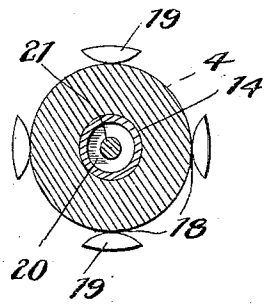
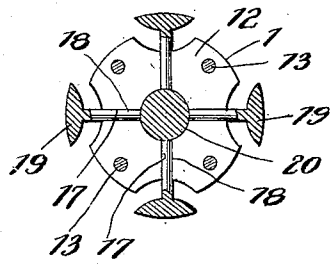


Fig. 7.



Witnesses

W. H. Rodwell

C. F. Griesbauer

Inventor

A. P. Kohler

By A. B. Williamson & Co

Attorneys

THE NORRIS PETERS CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ARTHUR P. KOHLER, OF JUNCTION CITY, KANSAS.

ROLLER TUBE-CUTTER.

No. 910,547. Specification of Letters Patent. Patented Jan. 26, 1909.

Application filed February 28, 1908. Serial No. 418,360.

To all whom it may concern:

Be it known that I, ARTHUR P. KOHLER, a citizen of the United States, residing at Junction City, in the county of Geary and State of Kansas, have invented certain new and useful Improvements in Roller 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.

This invention relates to improvements in boiler flue cutters.

The object of the invention is to provide a device of this character by means of which a tube or flue may be cut off on the inside or the outside of the tube sheet or within the tube hole of the sheet, thus providing for the removal of the old tubes without damaging or marring the flue sheets, leaving the same in readiness for the new tubes.

With this object in view, the invention consists of certain novel features of construction, combination and arrangement of parts as will be hereinafter described and particularly pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a side view of the cutter; Fig. 2 is a vertical longitudinal sectional view; Fig. 3 is a front end view; Fig. 4 is a cross sectional view on the line 4—4 of Fig. 2; Fig. 5 is a similar view on the line 5—5 of Fig. 2; Fig. 6 is a cross sectional view on the line 6—6 of Fig. 2; and Fig. 7 is a similar view on the line 7—7 of Fig. 2.

Referring more particularly to the drawings, 1 denotes the cutter-carrying portions of the tool, which are formed in a series of sections, between the forward two of which is arranged a series of expansible cutters, 2.

The two forward sections between which the cutters are arranged are preferably fastened together by a series of longitudinally disposed screws, 3, which are screwed into alined apertures formed in said sections. The rear section, 4, of the front or cutter portion of the tool is provided with a reduced exteriorly threaded extension, which is adapted to be screwed into the threaded socket formed in the adjacent end of the front portion of the tool.

The cutters, 2, are in the form of wheels which are revolubly mounted in the bifurcated outer end of expanding brackets, 5, said brackets being loosely mounted in radially disposed passages which are formed by alined recesses in the meeting faces of the two forward sections of the tool. The brackets, 5, are provided with rearwardly projecting right-angularly formed arms, 6, which are disposed in a cylindrical passage formed through the central section of the forward portion of the tool, as shown. The forward section of the tool is provided with a longitudinally disposed threaded bore, 7, which communicates at its inner end with the cylindrical passage in the adjacent section and in said bore is adapted to be screwed a tubular expanding cone, 8, the inner tapered end of which is adapted to engage with the inner faces of the arms, 6, of the brackets, 5, whereby when said cone is screwed inwardly, the brackets will be forced outwardly, thereby expanding or extending the cutters beyond the outer sides of the tool. On the outer end of the threaded portion of the expanding cone is formed an operating wheel, 9, having a series of radially disposed arms, 10, by means of which the cone is screwed inwardly or outwardly.

The cutter portion of the tool is revolubly mounted upon a holding portion, 12, said holding portion consisting of a cylindrical block, which is preferably formed in two sections, which are fastened together by longitudinally disposed fastening screws, 13, which are arranged therein, as shown. The inner section of the holding cylinder is provided with a reduced cylindrical bearing portion, 14, having on its outer end exterior screw threads. The reduced bearing extension, 14, is inserted through the cylindrical passage formed in the adjacent end of the rear section of the cutter portion of the tool, and upon said bearing extension the cutter portion of the tool is adapted to revolve, said portion being held in operative position on the extension by means of a nut, 15, which is screwed on the threaded end of the extension and lies within a cylindrical recess, 16, formed in the rear section of the cutter portion as shown.

The holding portion of the tool is provided with a series of radially disposed passages, 17, which are formed by alined grooves in the meeting faces of the two sections of said portion, and in said passages are slidably mounted radially disposed arms, 18, on the outer ends of which are secured longitudinally disposed holding plates, 19, which are adapted to be expanded against the inner side of the tube, thereby centering and holding the rear portion of the tool to provide a firm bearing

upon which the front or cutter portion is adapted to revolve. The plates, 19, are preferably provided with a curved checkered or serrated outer surface whereby the same will obtain a firm grip upon the inner walls of the tube.

The inner ends of the arms, 18, are preferably provided with enlarged obliquely disposed bearing surfaces with which is adapted to be engaged an expanding cone, 20, which is adapted to work through a cylindrical bore in the holding portion of the tool, and to said expanding cone is connected an operating rod, 21, which extends through the central passage and recesses of the tool, and through the tubular cutter expanding cone and projects beyond the hand wheel, 9, in position to be operated upon to force the cone, 20, inwardly and thereby expand the holding plates, also to draw said cone upwardly and thereby permit said plates to retract.

The cutting portion of the tool is adapted to be revolved on the reduced extension, 14, of the holding portion by means of an operating handle, 22, which is revolubly mounted on a reduced cylindrical neck, 23, formed on the outer end of the outer section of the cutter portion by means of bearing plates, 24, which are engaged with the cylindrical neck, 23, and are provided with outwardly extending arms, 25, which are bolted or otherwise secured to the inner portion of the handle, 22, as shown. On the neck, 23, between the plates, 24, is formed an annular series of ratchet teeth, 26, with which is adapted to be engaged a double pawl, 27, which is pivotally mounted between the plates, 24, and is provided on its upper edge with a centrally disposed offset or projection, 28. The pawl, 27, is adapted to be turned to bring one end or the other into engagement with the teeth, 26, said end being held in operative engagement by means of a slidably mounted stud, 29, arranged in the outer end of a socket, 30, formed in the inner portion of the handle, 22, said stud being held in yielding engagement with the pawl by means of a coiled spring, 31, which is arranged in said socket above the stud as shown. By engaging one end or the other of the pawl with the ratchet teeth, the cutter portion of the tool may be turned in one direction or the other by means of the handle, 22, as will be understood.

In operation, the tool is inserted in the end of the tube until the cutters are in the desired position, after which the cone 20 is forced inwardly to expand the clamping plates against the inner side of the tube, thus securely fastening the holding portion in place. The cutter expanding cone, 8, is now screwed inwardly to expand the cutters into engagement with the tube, after which the cutter portion of the tool is turned in the desired direction by the handle, 22, thereby causing the cutters to form a smooth, even cut, said cutters being gradually forced outwardly by their expanding cone until the tube has been entirely cut through. After the tube has thus been cut, the expanding cones, 8 and 20, are drawn outwardly, thus permitting the cutters and holding plates to retract, after which the tool may be readily removed from the tube.

Having thus described my invention, what I claim as new and desire to secure by Letters-Patent is:

1. In a tube cutter, a sectional holding portion, means to detachably secure the sections of said portion together, a sectional cutter portion revolubly mounted on said holding portion, means to detachably connect the sections of said cutter portion together, a series of expansible cutters in said cutter portion, a tubular cutter expanding cone provided with a threaded shank and having a threaded engagement with said cutter portion, expansible holding devices in said holding portion, an expanding cone to operate said holding devices, a shank on said cone adapted to project and operate through said tubular cutter operating cone, and means to revolve said cutter portion, substantially as described.

2. In a tube cutter, a sectional holding portion, means to detachably secure said sections together, expansible holding devices in said holding portion, a sectional cutter portion revolubly mounted on said holding portion, means to detachably secure the sections of said cutter portion together, a bearing extension on the outer end of said cutter portion, an annular series of ratchet teeth on said bearing extension, an operating lever revolubly mounted on said extension, a double pawl carried by said lever to engage said ratchet teeth whereby said cutter portion is turned in either direction, a series of expansible cutters in said cutter portion, a tubular cutter expanding cone, means to operate the latter to expand said cutters, an expanding cone slidable in said holding portion and adapted to expand the holding devices therein, and an operating shank on said cone adapted to project and operate through said tubular cutter expanding cone, substantially as described.

3. In a tube cutter, a sectional holding portion, a series of radially disposed arms slidably mounted between said sections, holding plates on the outer ends of said arms, an expanding cone adapted to be engaged with the inner ends of said arms, a sectional cutter portion revolubly mounted on said holding portion, right-angularly formed radially disposed expansible brackets arranged between the sections of said cutter portion, cutter wheels revolubly mounted in the outer ends of said brackets, a threaded expanding cone adapted to be screwed into the outer end of said cutter portion and into engage-

ment with said arms, whereby the same are expanded, means to operate said cones, a series of ratchet teeth arranged on the outer end of said cutter portion, a revolubly mounted handle, a double-ended pawl pivotally mounted on said handle, said pawl being adapted to be turned to engage one end or the other with said teeth, and a spring-projected stud adapted to engage said pawl and hold the same in operative position, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ARTHUR P. KOHLER.

Witnesses:
THOS. B. KENNEDY,
A. A. FLOWER.