J. PARKER.

CUTTER HOLDING DEVICE FOR MILLING MACHINES.

APPLICATION FILED DEC. 2, 1909.

963,935.

Patented July 12, 1910.

Fig. 1.

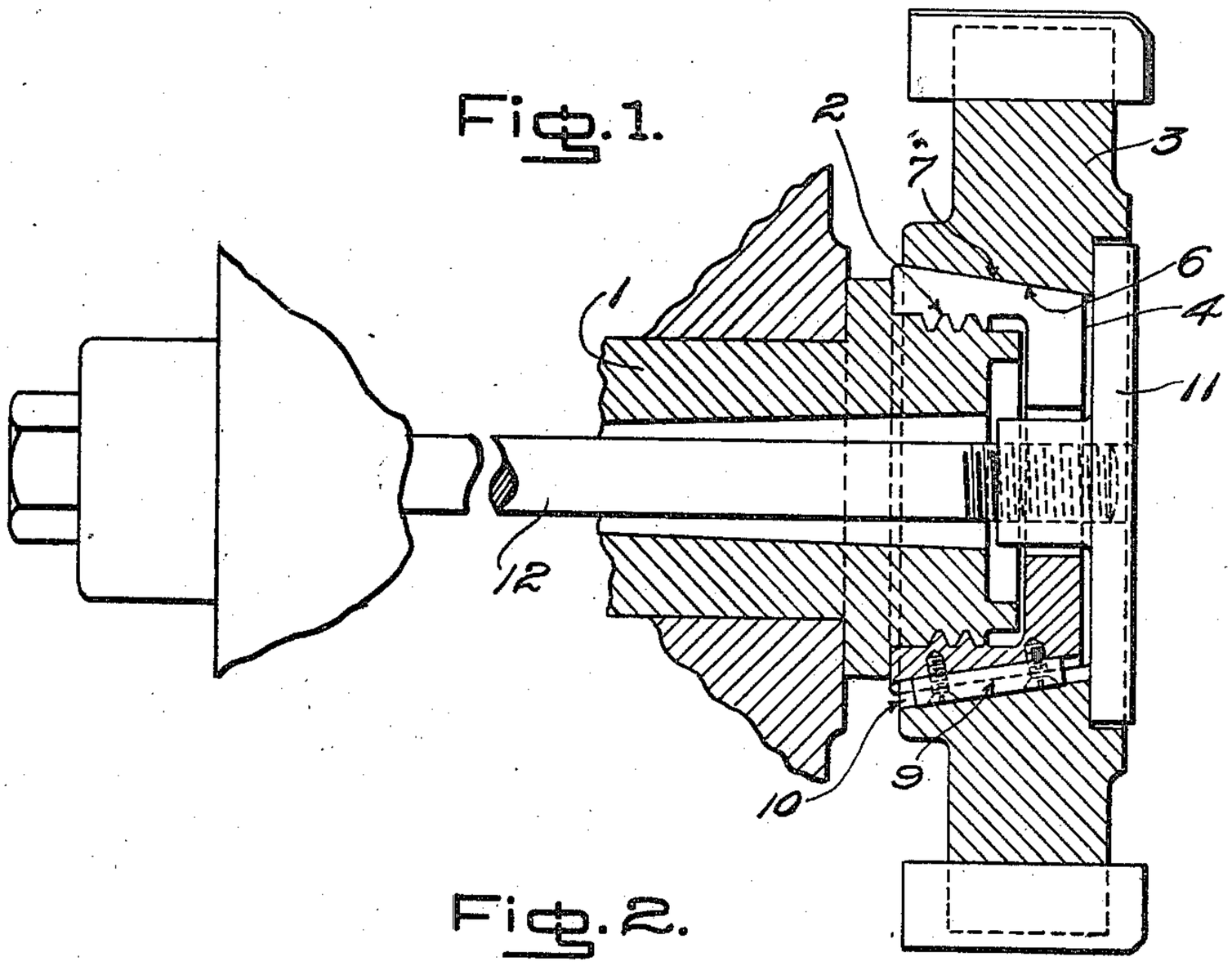
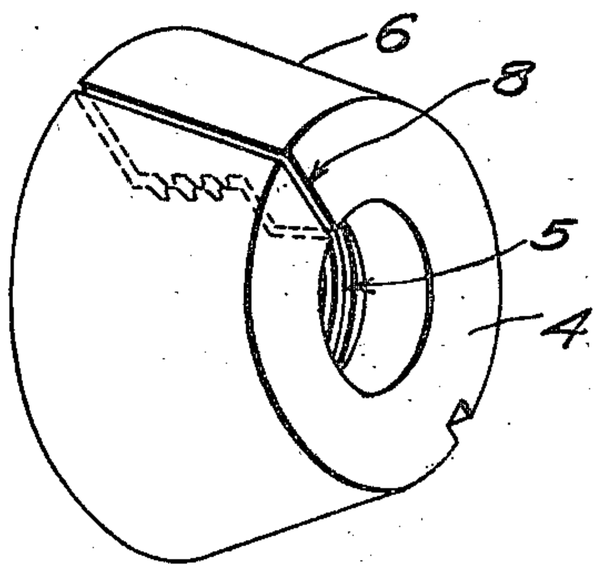


Fig. 2.



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UNITED STATES PATENT OFFICE.

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BOILER OR HEATER.

963,936. Specification of Letters Patent. **Patented July 12, 1910.**

Application filed March 19, 1908. Serial No. 422,125.

To all whom it may concern:

Be it known that I, JOHN H. PATON, of the city of Toronto, in the Province of Ontario and Dominion of Canada, have invented certain new and useful Improvements in Boilers or Heaters, and do hereby declare that the following is a full, clear, and exact description of same.

This invention relates to improvements in boilers or heaters and the main object of the invention is to provide a boiler that will be simple and inexpensive to construct; durable and efficient to maintain, and that will produce a maximum amount of heat with a minimum of space and fuel.

The invention consists essentially of a casing provided with openings to admit the fuel and exits for the burned gases. Within the casings are conversely arranged, tapered or V-shaped headers connected by means of a plurality of pipes of varying dimensions. The pipes and the spaces between a part of said pipes, are so constructed and arranged that a thin sheet of water or air is brought into contact with a very large heating surface of metal. The arrangement of the headers and pipes permits of a free circulation within the boiler and may be used for heating either by hot water or hot air.

Further details of construction will appear from the drawings in which:—

Figure 1 is a longitudinal section showing the outer jacket, headers, tubes and partitions. Fig. 2 is a transverse view of the inner end of the feed head. Fig. 3 is a longitudinal section of one of the tubes.

Referring to the parts, A designates a jacket or shell provided with an exit B through which the burned gases pass, and a plurality of openings C to admit the fuel burners. The feed header D is tapered or V-shaped, as shown, and is provided with one or more feed pipes E. Water or air is fed through the pipes E into the header D and by means of the tapered construction is forced through the tubes F and G to the flow header H which is also tapered or V-shaped and positioned conversely to the header D, thus obtaining the hottest water or air in the lowest extremity or narrow portion of the heater H, and forcing same to the top thereof into the flow pipes I. Plates or partitions J and K are located within the boilers between the tubes at suitable distances apart. The lower plate J is perforated and entirely fills the area between the headers and the sides of the heater. The plates K are solid, covering the entire width of the boiler and approximately three fourths of its length. The plates J are arranged at alternated ends of the boiler. The heat is equally distributed through the perforated plate J, and passing upward to the plates K, is driven to the alternate ends thereof, thus causing complete combustion of the gas and equalizing and distributing the heat to the tubes. In this manner the heat is entirely absorbed within the boiler. The tubes F and G are sufficiently raised at the flow end above the feed end to insure free circulation. Each of the upper tubes designated F is provided with an inner smaller tube L having inlet and outlet pipes M and N. The heat thus passes through the inner tube L, entering at the inlet M and escaping at the outlet N. The water passes from the feed header D, through the outer tube F, around the inner tube L of the header H, thus providing a greatly increased area of heating surface. The lower tubes G are of smaller diameter, not exceeding one half inch, and are centered alternately, thus causing the heat to strike the series of tubes immediately above in a direct manner.

It will be seen from the foregoing description that I have provided a boiler of simple and inexpensive construction; that will occupy a minimum of space; and that, owing to the great area of heating surface, will be rapid in action and efficient and economical in maintenance.

Although I have shown the preferred form of construction, it will be obvious that several modifications may be made in the construction and arrangement of tubes, inlet and outlet pipes, and such details, without departing from the spirit of my invention.

Having thus described my invention, what I claim is:—

1. A boiler or heater comprising a tapered feed header, a tapered flow header disposed conversely thereto, a plurality of small tubes connecting the lower portions of said headers, a plurality of larger tubes connecting the upper portions of said headers, pipes arranged concentrically within said larger tubes so as to leave an annular space between the pipes and surrounding tubes communicating with the headers, the ends of said pipes being sealed flush with the oppos-

will be found sufficient to drive the mill even under severe conditions. The mill is drawn firmly on to the sleeve by a retaining plate or washer 11 adapted to engage the front end of the mill, and provided with a screw threaded bore for engaging the thread on the end of a bolt 12 which passes through the spindle.

In securing the mill to the end of the spindle, the sleeve 4 is first screwed on to the spindle, and then the mill is placed in position on the sleeve and drawn firmly on to the sleeve by tightening the bolt 12. As the mill is drawn on to the tapered periphery of the split sleeve, the sleeve is caused to tightly hug the spindle, so that the mill is firmly and rigidly supported upon the end of the spindle, and an effective driving friction is secured between the sleeve and mill. The resistance offered to the cutting blades of the mill by the work tends to crowd the thread of the sleeve up the thread on the spindle, and thus spread or open the sleeve. This tends to increase the friction between the sleeve and the mill with the increase in the resistance offered by the work. When the mill is to be removed, the bolt 12 is unscrewed from the binding plate 11. The taper 6 on the sleeve 4 is sufficiently steep to permit the removal of the mill 3 without the application of any considerable force. As soon as the mill is removed the sleeve 4 is released so that it may open and be readily unscrewed from the end of the spindle.

The construction described not only enables large face mills to be readily applied to and removed from the spindle of a milling machine, but also enables the mill to be supported so that the cutting plane of the blades is close to the end of the spindle, with a resulting increase in the rigidity with which the cutters are supported.

A further advantage of this construction is that it enables the same mills to be utilized upon different machines having spindles of different diameters or different pitches of screw threads. By providing a series of sleeves 4 adapted to fit the spindles of the different machines, the same set of face mills may be used, thus avoiding the excessive expense incident to providing a different set of mills for each machine. This construction also requires no change in the spindles, so that the use of the mills and tools already on hand and adapted to be screwed upon the nose of the spindle is not interfered with.

While it is preferred to employ the specific construction and arrangement of parts shown and described, it will be understood that this construction and arrangement is not essential, except so far as set forth in the claims, and may be varied without departing from the invention.

Having explained the nature and object of the invention, and specifically described one form in which it may be embodied, what I claim is:—

1. A cutter securing device comprising a split sleeve having an interior screw thread for engaging the thread on the nose of a spindle and having a tapered periphery to engage a cutter having a correspondingly tapered bore, and means for holding the cutter on the sleeve, substantially as described.

2. A cutter securing device comprising a split sleeve having an interior thread for engaging the thread on the nose of a spindle and having a tapered periphery to engage a cutter having a correspondingly tapered bore, a retaining plate for holding the cutter on the sleeve, and a bolt connected with the plate for drawing the cutter on to the sleeve, substantially as described.

3. A cutter securing means, having, in combination, a hollow spindle provided with a screw threaded nose, a split sleeve having an interior thread for engaging the thread on the nose of the spindle and having a tapered periphery to engage a cutter having a correspondingly tapered bore, a retaining plate, and a bolt connected with the plate and extending through the spindle for drawing the cutter on to the sleeve, substantially as described.

4. A cutter securing device comprising a split sleeve having an interior screw thread for engaging the thread on the nose of the spindle and having a tapered surface to engage a corresponding surface within the bore of the cutter, and means for holding the cutter on the sleeve, substantially as described.

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