Dec. 17, 1940. H. G. CRAM 2,224,857

TOOL FOR USE IN ASSEMBLING AND DISASSEMBLING THE SIPHONS OF DRIER DRUMS

Filed Sept. 16, 1937 2 Sheets-Sheet 1

Fig. 1.

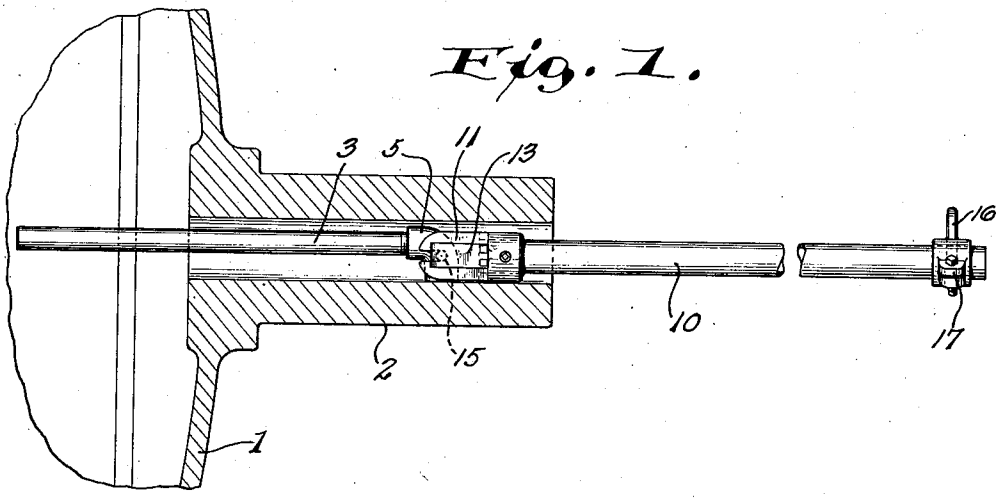


Fig. 2.

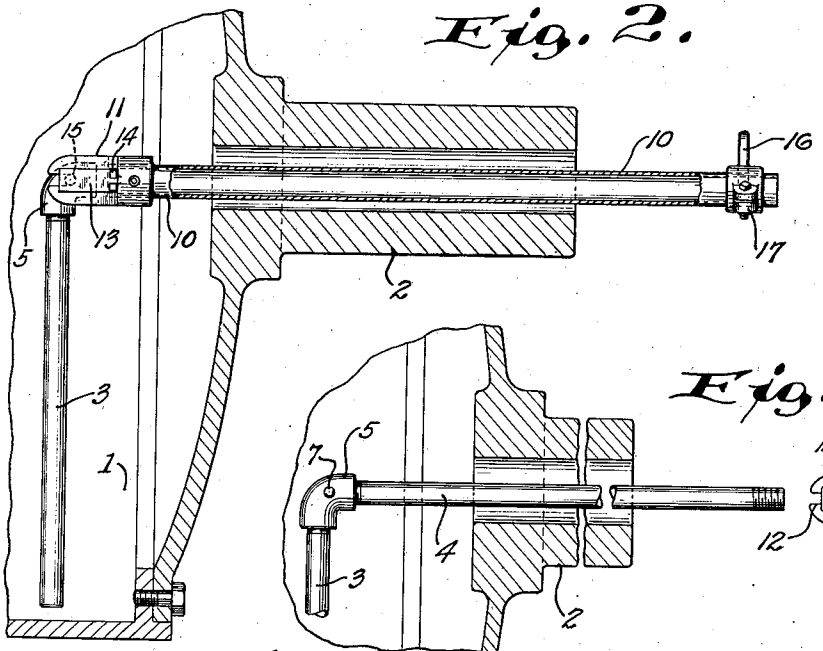


Fig. 5.

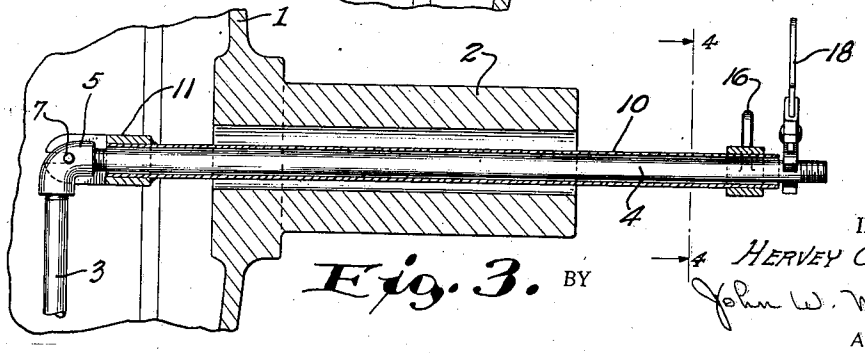


Fig. 3.

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Fig. 4.

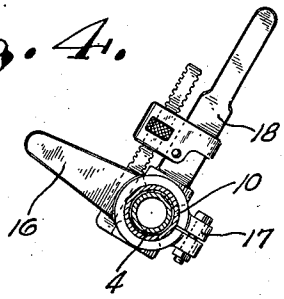


Fig. 6.

Fig. 8.

Fig. 7.

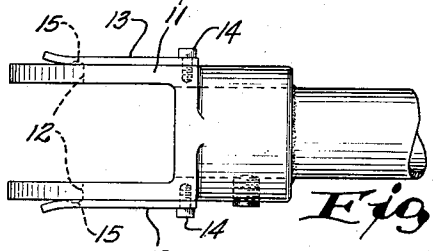


Fig. 10.

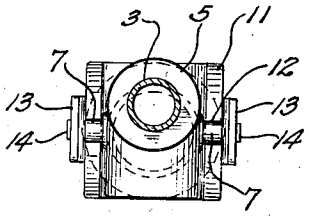


Fig. 11.

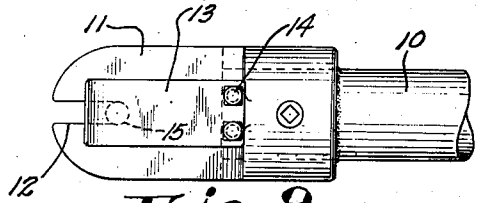


Fig. 9.

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UNITED STATES PATENT OFFICE

2,224,857

TOOL FOR USE IN ASSEMBLING AND DISASSEMBLING THE SIPHONS OF DRIER DRUMS

Hervey G. Cram, Appleton, Wis.

Application September 16, 1937, Serial No. 164,182

3 Claims. (Cl. 29—84)

This invention relates to an improvement in siphons for drier drainage systems and to means designed to facilitate the assembly and disassembly of siphons with the drier drums.

In paper making machinery it is customary to employ a battery of driers. Each drier has a drier drum to the interior of which steam is supplied for the purpose of heating the drum. Naturally the steam condenses and efficient operation requires that this condensate be removed. For this purpose it has been the practice to provide each drier drum with some form of siphon usually in the form of a curved pipe extending through a steam joint in the outer end of one of the hollow trunnions of the drier and then curved down to a low point in the drier. Where such a pipe is employed it must be curved on a large enough radius and be of such length that it may be inserted through the rather long hollow trunnion of the drier and yet have its low inlet end close to the low point in the drier drum. Where such an arrangement is resorted to a number of difficulties are encountered. In the first place, any oscillation of the steam joint, and the vibrations incidental to the operation of the machine always result in some oscillation, will be transmitted in the low or inlet end of the siphon pipe due to the lever arm between the low or inlet end of the siphon pipe and the point of its support on the steam joint. Consequently there is danger of the inlet end of the siphon pipe contacting the rotating drier drum. Such contact will result in damage to the siphon or closing of its inlet end thereby preventing it from functioning to remove the condensate. Furthermore, the necessary long length of the siphon pipe increases its weight and also increases the leverage with which this weight is applied to the point of its support to the steam joint thereby putting excessive strain on the siphon at the point of its support.

Any other arrangements that have been proposed and which do not involve the use of a long curved pipe require the installation of a siphon arrangement through hand holes in the head of the drier and working them back through the trunnion from the inside of the drier. These are difficult and expensive expedients and especially so as the driers are generally at a high temperature.

The present invention proposes a siphon which in the assembly is made up of a vertical pipe leg disposed within the drier drum adjacent the inner end of one hollow trunnion of the drier and extending from a point close to the axis of rotation of the drier down to a low point in the drier drum. A horizontal pipe leg extends through the steam joint and through the hollow trunnion and has its inner end disposed adjacent the upper end of the vertical pipe leg. An elbow threadedly interconnects the inner end of the horizontal leg with the upper end of the vertical leg. The elbow is provided with projections which may take the form of diametrically opposed horizontal pins projecting laterally from the sides of the elbow.

Along with this siphon arrangement the present invention proposes a tool designed to facilitate its assembly and disassembly with the drier drum. The tool comprises an elongated barrel provided at its inner end with a hollow head. The head and barrel are so dimensioned as to be susceptible of convenient insertion in through the hollow trunnion of the drier drum. The head of the tool is provided with diametrically opposed slots adapted to receive the pins of the elbow and is also equipped with spring devices engageable with the outer ends of the pins to retain them in the slots while permitting them to pivot therein about their own axes.

With such a tool and a siphon constructed in the manner described, the siphon may be assembled with the drier drum as follows: The elbow is first securely threadedly engaged with the upper end of the vertical leg of the siphon. The horizontal leg is left disconnected. The pins of the elbow are then introduced into the slots of the head of the tool and snapped under the spring device thereof. The vertical leg and elbow are then swung into horizontal alinement with the tool and are introduced while so positioned through the hollow trunnion of the drier drum, the steam joint having been removed. As the vertical leg of the pipe and elbow pass through the trunnion and into the drum they swing about their pins around to a position where the vertical leg is vertically disposed in the drum. The horizontal leg of the siphon is then introduced through the barrel. The barrel is provided with means whereby it may be held against rotation and a Stillson wrench or other suitable tool is utilized to turn the horizontal leg up into firm and secured threaded engagement with the elbow. The tool is then pulled back off of the siphon arrangement and the steam joint assembled. The reversal of this operation will effect disassembly of the parts.

This arrangement has the distinct advantage of greatly facilitating the assembly and disassembly of the siphon. When the siphon is installed

it avoids the disadvantages of the previous arrangements. It is firmly supported through a very short lever arm.

The effect of vibration on it is minimized. Consequently the inner end of the vertical leg of the pipe may be disposed at a low point in the drier and close to the drum without danger of damage and with the advantage of more efficient operation.

Other objects and advantages reside in certain novel features of the construction, arrangement and combination of parts which will be hereinafter more fully described and particularly pointed out in the appended claims, reference being had to the accompanying drawings forming a part of this specification and in which:

Figure 1 is a view partly in side elevation and partly in vertical cross section illustrating the tool in the operation of inserting the vertical leg and elbow in through the hollow trunnion of a drier drum;

Figure 2 is a view similar to Figure 1 but showing how the vertical leg swings around to vertical position after the inserting operation has been completed;

Figure 3 is a similar view showing how the horizontal leg of the siphon is coupled with the elbow;

Figure 4 is a view in cross section taken on line 4—4 of Figure 3;

Figure 5 is a fragmentary view partly in vertical section and partly in side elevation showing how the tool is removed from the assembled legs of the siphon;

Figure 6 is a view partly in side elevation and partly in vertical cross section showing the steam joint assembled with the trunnion of the drier drum and with the siphon arrangement;

Figure 7 is a fragmentary view in side elevation and on an enlarged scale showing the elbow and a fragment of one of the pipe legs of the siphon;

Figure 8 is a view in end elevation looking toward the left hand side of Figure 7;

Figure 9 is a fragmentary view in side elevation showing the head and a portion of the barrel of the tool;

Figure 10 is a view thereof in top plan; and

Figure 11 is a view in end elevation illustrating the tool and showing the elbow and its pins assembled therewith.

Referring to the drawings, the numeral 1 designates a drier drum provided with the usual hollow trunnions, one of which is shown at 2.

The siphon arrangement embodying the present invention includes a vertical leg 3, a horizontal leg 4, and an elbow 5 threadedly interconnected with the upper end of the vertical leg and the inner end of the horizontal leg 4. In the assembly the horizontal leg 4 passes through and is supported in the conventional steam joint 6. As the structure of the steam joint is well known and is conventional it will not be described in detail. It will be noted however that it is detachably secured to the outer end of the hollow trunnion of the drier.

The elbow 5 is provided with diametrically opposed pins 7 which are fixed to the elbow and project laterally therefrom.

The tool used for assembling and disassembling the siphon with the drier includes an elongated barrel 10. A hollow bifurcated head 11 is fixed to the inner end of the barrel and has diametrically opposite slots 12 designed to receive the pins 7. Springs 13 are secured by screws 14 to the head and overlie the slots 12. The inner faces of these springs are formed with indentations or recesses 15 into which the outer ends of the pins snap. In this way the pins and the elbow are releasably secured in the slots 12 although they may pivot therein about their own axes.

In assembling the siphon with the drum, the elbow 5 is first securely threadedly interconnected with the upper end of the vertical leg 3. The pins 7 of the elbow are then introduced into the slots 12 and snapped into engagement with the recesses 15 of the springs 13. The leg 3, elbow 5 and tool are then passed in through the hollow trunnion 2 as shown in Figure 1 until the leg 3 drops down to the vertical position shown in Figure 2. The horizontal leg 4 of the siphon is then introduced in through the barrel 10 and its inner end is threaded into the elbow. In order that it may be turned up into very secure engagement with the elbow a handle 16 is clamped as at 17 to the outer end of the barrel and provides a means whereby the barrel may be held against rotation. A suitable tool such as a Stillson wrench 18 may be engaged with the outer end of the horizontal leg 4 which projects beyond the outer end of the barrel 10 to effect the desired tight engagement between the inner end of the leg 4 and the elbow 5. The wrench 18 is then disengaged and the tool pulled back off of the leg 4, the springs 13 yielding to allow the pins 7 to be disengaged. The outer end of the leg 4 may be held against axial movement at this time.

The steam joint 6 is then assembled and the siphon is ready for use.

By removing the steam joint and reversing the operation just described the siphon may be readily removed.

While I have shown and described one construction in which the invention may be advantageously embodied, it is to be understood that the construction shown has been selected merely for the purpose of illustration or example and that various changes in the size, shape and arrangement of the parts may be made without departing from the spirit of the invention or the scope of the subjoined claims.

The invention claimed is:

1. A tool for use in assembling and disassembling angularly related and threadedly interconnected parts in crowded quarters and comprising an elongated barrel adapted to be telescoped over one of the parts, a hollow head secured to one end of the barrel and having slots adapted to receive projections on another of said parts, and means on the head adapted to engage the projections and retain them in the slots while providing for pivotal movement thereof about their own axes.

2. A tool for use in assembling and disassembling angularly related and threadedly interconnected parts in crowded quarters and comprising an elongated barrel adapted to be telescoped over one of the parts, a hollow head secured to one end of the barrel and having slots adapted to receive projections on another of said parts, and spring devices carried by the head and overlying the slots and adapted to engage the projections and retain them in the slots while providing for pivotal movement thereof about their own axes.

3. A tool for use in assembling and disassembling the horizontal and vertical legs of a siphon of a drier drum of the type wherein the legs are connected together by an elbow with which they

are threadedly engaged and comprising an elongated barrel having a hollow bifurcated head, said barrel and its head being adapted to be telescoped over the horizontal leg of the siphon with the bifurcations of the head straddling said elbow, said bifurcations having opposed slots adapted to slidably receive lateral projections on the elbow, and spring plates secured to the head and overlapping the slots and having sockets adapted to snap over and interengage with the ends of the projections to retain them in the slots and constrain them against all but pivotal movement about their own axis while the projections and sockets are interengaged.

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