HEINE SAFETY BOILER CO. *v.* ANHEUSER-BUSCH BREWING ASS'N. SAME *v.* SMITH FEED WATER HEATER & PURIFIER CO.

Circuit Court, E. D. Missouri, E. D. September 19, 1890.

PATENTS FOR INVENTIONS—MUD-DRUMS—INFRINGEMENT.

The second claim of letters patent No. 1304, 195, issued August 26, 1894, to Adolphus Meier & Co., assignees of Herman Heine, for the combination, with the upper shell of a water tube steam-generator, of a mud-drum, mounted below the normal water-line, with its feed and outlet passages at the same end of the drum, is not infringed by the device described in letters-patent No. 349,187, which consists of a tubular vessel, divided from end to end into two separate compartments, with its feed and outlet passages at the same end; since, in view of the prior state of the art, the former patent must be restricted to a mud-drum having but one chamber, as shown in its drawings and specifications.

In Equity.

Paul Bakewell, for complainant.

Lee & Ellis and *Fowler & Fowler* for defendants.

THAYER, J. This is a suit for the alleged infringement of the second claim of United States letters patent No. 304,195, issued August 26, 1884, to Adolphus Meier & Co., assignees of Herman Heine. The patent, as a whole, is for "a new and useful steam-generator," first patented by Heine in Germany on May 18, 1881. The second claim, however, concerning which the controversy arises is, for a, "mud-drum" in combination with the shell of the steam-generator, and is in the following language.

"I claim * * * (2) The combination, with the upper shell or circulating drum of a water-tube steam-generator of a mud-drum, mounted within said circulating drum below the norinal water-line, the feed and outlet passages being at the same end of the drum; so that the current is opposed to the feed current, and is deflected backward by the upper current in the water leg."

Complainant's counsel contends that much of the language of the claim may be ignored as immaterial, and as not imposing any limitations on the claim. For instance, it is said that the word "water-tube," as used in the claim, is unimportant; and does not limit the patentee to the use of a boiler having a water-leg; also, that the concluding clause of the claim—"so that the current is opposed to the feed current, and is deflected backward by the upward current in the water-leg"—is merely descriptive matter, and does not narrow the claim; in other words, complainant's counsel construes the claim precisely as if the inventor had said:

"I claim the combination, with the upper shell or circulating drum of any steam-generator, of a mud-drum, mounted within Said-circulating drum below the normed water-line, the feed and outlet passages where of are at the same end of the mud-drum."

Furthermore, as the claim contains no description of the Mud-drum forming a part of the combination, other than that it is located within

the boiler below the normal water-line, and has its feed and outlet passages, at the same end, it is contended by complainant that it is immaterial what the form or construction of the mud-drum in other respects may be; that the second claim of the Heine patent is infringed whenever a mud-drum with feed and outlet passages at the same end is placed within the shell of a steam generator or boiler, below the normal water-line.

If these contentions are, tenable, undoubtedly defendants are severally guilty of an infringement; hence the first step towards a decision is to settle the construction of Heine's second claim, and this involves a preliminary consideration of the state of the art at the date of Heine's alleged invention, as well as an examination of his specification and drawings

The evidence shows that mud-drums have long been, in use in connection with steam-generators, for the purpose of clarifying and heating feed-water before it comes in, contact with the shell of a boiler, and thus preventing incrustations to some extent, and the too sudden contraction of the hot boiler plates. Heine was not the first man; who constructed a mud-drum, or who located such a device within the shell of a boiler below the normal water-line, and hence is not to be treated as a pioneer; inventor. On the contrary, this particular field of invention seems to have been well tilled before he entered it. In 1866, Trotman, an English inventor, devised a mud-drum, or "feed-box," as he termed it, for use in the interior of steam generators or boilers. Trotman's device consisted of a box, divided by a horizontal diaphragm into two compartments,—an upper and lower,—which box was placed within the boiler below the normal water-line. The lower compartment was subdivided into a middle and two end compartments, the latter of which were connected, by pipes. The feed-pipe passed through the top or cover of the box, and through the diaphragm into the lower middle compartment, where it discharged; feed-water, which flowed, first, through holes provided for that purpose into one of the lower end compartments, thence through pipes into the other lower end compartment, thence through holes in the diaphragm into the upper compartment, and thence through holes in the top or cover of the box, immediately contiguous to the feed-pipe, into the main cavity or circulating drum of the boiler. The feed-box in question was so arranged that it might be taken out of the boiler and readily cleaned by removing the cover and the interior diaphragm and pipes, *Vide* English Letters Patent No. 1890. Trotman appears to have utilized whatever advantage is gained by placing the mud-drum of a boiler below the normal water-line, instead of locating it in the steam space or chamber. In 1872 John W. Youman invented an apparatus for heating and purifying feed-water before it comes in contact with the shell of the boiler. His device consists of a feed-pipe, bent very much into the shape of an ox-bow, and suspended within the shell of a boiler above the, water-line, both ends of which pipe pass through the head-plate of the boiler, and are provided on the outside

with stopcocks, so that one can; be used to admit feed-water and the other as a blow-off. One leg of the pipe, within the boiler (that to which the blow-off is attached)

has a greater diameter than the other leg of the pipe, and is perforated near the end or head-plate with numerous small holes, through which feed-water is introduced into the boiler in small jets, after it has twice traversed the steam space through the bent pipe, and become heated and partially clarified. By opening the blow-off valve, the sediment which collects in the feed-pipe is discharged at intervals. *Vide* U. S, Letters Patent No. 132,888. In 1878 J. A. McCormick invented and obtained a patent on a mud-drum located within a boiler above the water-line, which consists merely of a trough-shaped vessel, open at the top, and suspended by bolts from the upper shell of the boiler in such manner that one end is lower than the other. This permits sediment to collect at that end, and be blown off at intervals through a blow-off pipe entering the trough at that point. The feed-pipe passes through the shell of the boiler, and discharges water into the upper or higher end of the trough, and, after the latter, has become full, the water either overflows into the boiler, or runs into the same through a series of holes along the upper edges of the trough. *Vide* U. S. Letters Patent No. 208,479. In 1881, Andrew J. Stevens also obtained a patent on a feed-water purifier and heater. His device consists of a water tube or cylinder Suspended within the steam-generator above the Water-line. The inner or rear end of the tube is closed by a cap, and the forward end by the head-plate of the boiler, against which it abuts and is firmly secured. The feed-water is discharged into the front end of the tube by a pipe, and, after flowing the entire length of the tube, which is of nearly the same length as the boiler, passes into the boiler through a series of holes in the upper shell of the tube, near the rear end. *Vide* U. S. Letters Patent No. 240,197. Another patent, granted to Lee and Bell on August 12, 1884, (U. S. Letters Patent No. 303,523,) shows a device for heating and purifying feed-water very similar to the Stevens' device last mentioned, and need not be particularly described. The Heine mud-drum, involved in this case, as the specification and drawings show, is simply a box-like vessel, placed within a boiler below the water-line, and has but one chamber or compartment. The drawings further show that the mud-drum in question is set on a slight incline, corresponding with the incline on which Heine sets his boiler, the rear end of the mud-drum being somewhat lower than the front end. The feed-pipe enters the forward end of the drum near the bottom. A blow-off pipe leads from the drum at its rear end, where the sediment is supposed to settle. An inclined plate is set within the drum a short, distance in front of the mouth of the feed-pipe, to partially break the force of the feed-current, and, as the inventor says, "to prevent the feed-water from stirring up the deposit of mud, etc., which collects in the rear portion of the mud-catcher." A portion of the top and end shell of the mud-drum above the mouth of the feed-pipe is cut away to some extent, to form an aperture through which the feed-water may escape from the drum into the boiler, and mingle with the water therein, after it is heated and clarified.

Heine's specification does not contain a Very full description of the operation of his mud-drum, but enough is said, I think, to show the object

he had in view, and the result that he intended to accomplish. Thus be says in his specification that "in the rear portion of the mud-catcher the motion of the water will be very slack, at the same time its temperature being above the boiling point; hence said two conditions insure the deposit of nearly the entire sediment * * * of the water, which is thus deposited in a convenient receptacle for blowing off," etc.; and in the concluding paragraph of his claim he says of the current issuing from the drum that "the current is opposed to the feed-current," etc.

From what is thus said the court must infer that the inventor intended to create two currents within the drum, which should flow in opposite directions, and oppose each other with some force immediately above the, inclined plate; the result of such opposition being to create a body of very slack water, and thus induce sedimentation behind the inclined plate, to which point the incoming current of cold water would naturally settle by reason of its greater specific gravity, after its motion was in part arrested by the out flowing current of hot water. That such is the practical operation of Heine's mud-catcher, and that such was his theory of its operation and effect at the time he devised, it, is further illustrated by the evidence of certain experts who have testified in complainant's favor. They say, in substance, that the cold feed current is deflected upward by the inclined plate, there meets with some resistance from the returning hot current, falls behind the plate to the bottom of the drum, where it displaces, and forces upward and outward, water that has become heated, and, eventually becoming heated, is itself in like manner forced upward and outward along the upper shell of the drum, to the outlet passage at its front end.

Now, in view of the prior patents above described, the court is of the opinion that plaintiff cannot be allowed the broad construction of the second claim of its patent, for which its counsel contends, but should, be limited, if not to the precise kind of mud-drum shown by the drawings and specification, at least to a mud-drum having only one chamber or compartment. All of the prior patents show a mud-drum mounted within the shell or circulating drum of a boiler, and thus exhibit the general features or elements of the combination covered by Heine's second claim. The idea also of discharging feed-water into a receptacle of some kind located within a boiler, and suffering it to remain therein until it is heated and partially purified, before it flows into the boiler, is an idea that underlies the construction of all the mud-drums heretofore described, including Heine's mud-catcher. That which distinguishes the several combinations shown by the various patents from each other is the peculiar form of receptacle employed in each case to receive and retain the feed-water long enough for it to become heated and partially clarified; and it seems obvious that, after the idea of placing such a receptacle within the boiler was conceived, it became possible to construct such a receptacle in a variety of ways, by the exercise of

ordinary mechanical skill, without materially impairing the efficiency of the device as a water heater and purifier.

An inventor like Heine, who has merely changed the form of the receptacle hitherto in use for receiving and heating feed-water, is not entitled to a broad construction of his claims, but should be limited to that form of receptacle which his specifications and drawings disclose. *Bragg* v. *Fitch,* 121 U. S. 483, 7 Sup. Ct. Rep. 978; *Sargent* v. *Lock Co.,* 114 U. S. 85, 86, 5 Sup. Ct. Rep. 1021; *Eaton* v. *Thompson,* 114 U. S. 1, 14, 5 Sup. Ct. Rep. 1042; *Brown* v. *Davis,* 116 U. S. 250, 251, 6 Sup. Ct, Rep. 879; *Wollensak* v. *Reiher,* 115 U. S. 94, 5 Sup. Ct. Rep. 1132; *Clark* v. *Manufacturing Co.,* 115 U. S. 79, 5 Sup. Ct. Rep. 1190. By so limiting his Claim,—that is to say, to a mud-drum having a single chamber—it is evident, I think, that he will realize the full benefit of whatever advantage his special form of construction has over other forms previously in use, and that is all he is legitimately entitled to. If Heine's mud-catcher operates to heat and clarify feed-water any more perfectly than other devices previously in use, it is evidently due, in a great measure, to the fact that the incoming current of cold feed-water is opposed within the drum, and just above the inclined plate, by an outgoing current of hot water, thus creating a body of comparatively quiet water back of the inclined plate, and inducing a more perfect precipitation of sediment. In other words, it is due to the fact that the feed-water does not flow from the inlet to the outlet passage at a uniform rate of speed, and with a continuous current, as in most other devices, but is arrested, and held in suspension as it were, by an opposing current. This result—that is to say, the creation; Of opposing currents Within the drum, whereby a greater deposit of sediment is induced—is evidently brought about by the use of a receptacle for feed-Water having but a single chamber. Hence the use of a single chamber appears to be material and important in producing the particular result that Heine had in view, and for that reason it is proper to read such a limitation into his claims.

As before shown, the complainant attempts to bring all mud-drums within the second claim of its patent that are located below the normal water-line, and have the feed and outlet passages at the same end of the drum, regardless of all other peculiarities of structure. It thus makes the location of the drum and the location of the feed and outlet passages the sole limiting features of its second claim, utterly ignoring other features of Construction that Heine's specification and drawings exhibit, that are essential to produce the effect that he had in view. Now, inasmuch as the combination Of the shell of a boiler with a mud-drum located in the interior of the same was old, it occurs to the court that the patentee was not entitled to make the features aforesaid the sole limiting features of his claim, unless they were at the time substantially new and useful structural features. In view of the prior state of the art, the invention is made to consist substantially in the new location of the drum, and the feed and Outlet passages, if the complainant's contention is sustained. But, whatever may be said Of the importance of locating the drum below the normal water-line instead of above it, it certainly cannot be pretended that Heine Was the

first one to discover such advantage, or to utilize it, because Trotman, as is above shown, placed his feed-box

or mud-catcher in the very bottom of the boiler, and Youman's specification also suggest the idea of locating the mud-drum below the water-line. Neither does it appear to the court that there was anything substantially new in the idea of locating the feed and outlet passages at the same end of the drum. The sole object of that method of construction was to compel the feed-water to traverse a sufficient space to become heated and drop its sediment before it was discharged into the boiler. With the same object in view, Youman, in the feed-water heater and purifier by him invented and above described, placed the outlet passage near the front end of the boiler, not far from the inlet passage, so as to compel the feed-water to make the circuit of the boiler before it was discharged into the same. The same idea is also involved in Trotman's feed-box. The feed-water makes the circuit of the box and its several compartments, and is discharged into the boiler at about the same point where it enters the box.

My conclusion is that the second claim of the Heine patent cannot be sustained, unless the mud-drum that he brings into combination with the upper Shell of a steam-generator., be understood to be a mud-catcher embodying substantially all of the structural features which his drawings disclose.

In view of what has been said, and the limitations, imposed by the court on Heine's Second claim, it follows, that the "Smith Feed-water Heater & Purifier," the alleged infringing device, does not interfere with complainant's patent, and its use is not an infringement, as charged in the bill. Smith's heater and purifier, or "mud-drum," as it may be termed, is also patented. *Vide* U. S. letters patent, No. 349,181. It consists of a tubular vessel, nearly as long as the boiler, which is suspended within the boiler, and is divided from end to end by a diaphragm into two separate chamber or compartments. The feed-water is introduced into the lower chamber at one end. It then flows through the lower compartment to the far end, rises through holes in the, diaphragm to the upper chamber, flows back through that chamber to the entering end, and passes through holes in the top shell of the chamber into the boiler. It is also provided with a blow-off, by which the sediment that collects in the two chambers can be removed. As the complainant, in the opinion of the court, must be limited to a mud-drum such as his specification and drawings disclose,—that is, to a drum having but one chamber,—it follows that Smith' device with its two chambers is not an infringement.

The bill will be dismissed.