

from the receiver to Buck. The court cannot assent to this view. If there were no other objection, it enables the defendant to take advantage of his own wrong and actually profit by his neglect to do what it was clearly his duty to do. Equity will not permit a failure of justice upon such narrow grounds. As between the complainant and Buck the assignment should be treated as having been made on the 6th of March, 1889.

It is unnecessary to determine what might have been the result had the state court by decree in equity compelled Buck to assign to Newton and Newton to the receiver, for no such decree was made. The receiver's title rests solely upon the order of the state court in proceedings supplementary to the execution. The rule seems to be well settled that an assignment can only be made by the actual owner of the patent. That rights under the patent cannot be sold by a sheriff on execution, and do not, like other incorporeal rights, vest in a receiver. They may, however, in a proper case, be reached by creditors' bill. Walk. Pat. (3d Ed.) § 156; Rob. Pat. § 766; Ager v. Murray, 105 U. S. 126; Gordon v. Anthony, 16 Blatchf. 234, 248, Fed. Cas. No. 5,605. It is thought, therefore, that the defendant took nothing by his assignment from the receiver. At all events every one who had a vestige of interest in the patent is now before the court; the mutual mistake, in leaving out the patent in question from the 1889 agreement, has been established beyond the peradventure of a doubt and almost without contradiction; the equities are with the complainant, and no serious objection can be urged to the settlement of the rights of all parties at this time upon equitable principles. What the defendant should have done in 1889 may be done now nunc pro tunc. The royalties due to the defendant can be taken care of on the accounting.

The complainant is entitled to a decree in accordance with the prayer of the bill.

STIRLING CO. v. PIERPOINT BOILER CO. et al.

(Circuit Court, W. D. Pennsylvania. August 13, 1895.)

No. 15, May Term, 1893.

1. PATENTS—CONSTRUCTION OF CLAIMS—INFRINGEMENT.

Where the claims of a patent for a water-tube boiler were limited to a combination having "the single mud drum," substantially as described, *held*, that the patent could not be construed to cover a boiler having three mud drums.

2. SAME—INFRINGEMENT SUITS—BURDEN OF PROOF.

Where the question of infringement of a patent for a water-tube boiler depended upon the existence of a particular circulation of the water in defendant's boiler, *held*, that the burden of proof was on complainant to establish the fact of its actual existence, and not merely the possibility or probability of its existence.

3. SAME—WATER-TUBE BOILERS.

The Stirling patent, No. 407,260, for an improvement in water-tube boilers, is not for a pioneer invention, but covers a structure combining simplicity, economy, and effectiveness; and, assuming that the combination involves novelty and patentability, the owner thereof will be protected as against others using substantially the same elements, or their equivalents, to accomplish the same result in substantially the same way.

4. SAME.

The Stirling patents, No. 407,260 and No. 479,678, for improvements in water-tube boilers, construed, and *held* not infringed.

This was a suit in equity by the Stirling Company against the Pierpoint Boiler Company and others for alleged infringement of certain patents for improvements in steam boilers.

Banning & Banning, Kay & Totten, and Henry W. Blodgett, for complainant.

Bakewell & Bakewell, for defendants.

Before ACHESON, Circuit Judge, and BUFFINGTON, District Judge.

BUFFINGTON, District Judge. On July 10, 1889, letters patent No. 407,260, and on July 26, 1892, letters patent No. 479,678, issued to Allan Stirling, assignor to the International Boiler Company, for improvements in steam boilers. This bill is filed by the Stirling Company, to which the patents have been duly assigned, against the Pierpoint Boiler Company and the officers thereof, alleging infringement of all the claims of said patents. The answer denies novelty and patentability; avers anticipation in certain prior patents of the United States and France; that every substantial element of the second patent was disclosed in the first; and asserts that, in view of the prior state of the art, the claims cannot be so construed as to make respondents' structures infringements. The boilers of both parties are water-tube boilers; that is, water is confined in banks of tubes, the outer surfaces of which are exposed to the flame, as distinguished from locomotive or fire-tubes boilers, in which heating gases pass through tubes surrounded by water. Water-tube boilers include two classes,—those whose tubes are horizontal, or substantially so, and connected at the ends by headers, and those whose tubes are vertical, and connected at the ends to cylindrical drums. The boilers of the present case are of the latter type.

From the specification of the first patent it would seem Stirling conceived there were three objectionable features in prior boiler construction, which he proposed to improve or obviate, namely: First, lack of circulation through the mud drum; secondly, lack of compactness of construction; and, thirdly, difficulty in cleaning. He sets these forth in the specification of the first patent as follows:

"Heretofore, in the so-called 'water-tube' boilers, in which the water is in the tubes and the flame outside, the tubes have usually been inserted in headers made of cast metal, so arranged that a number of tubes have only one outlet to the steam and water space above and of the mud drum beneath. In these boilers there is no circulation through the mud drum, and the enormous velocity of the currents in the outlets to the steam and water space is detrimental to the boiler, and precludes a proper circulation. Water-tube boilers, as heretofore constructed, have also been found objectionable because of the large space which they occupy, and the large number of hand-holes with covers and bolts necessary to get at the inside of the tubes for cleaning; and it has also been found impossible to get at the outside of the tubes to clean them from soot. These disadvantages have been obviated by my invention."

The alleged defects he overcomes by a new arrangement of parts in what is well termed a "fan-shaped" boiler. In the first patent, back of the grate a mud drum is shown, from which series of tubes extend upward, incline forward, and connect with two steam and water drums (the rear of which is a feed drum) adjacent to each other on the same plane. The steam and water spaces of these two are respectively connected by steam and water tubes. Each of the drums has a manhole for access to its interior. Over the grate is a fire-brick arch, intended to confine the flame and insure combustion of the gases at that point, and force them against the lower portions of the tubes leading from the mud drum to the front steam and water drum. A baffle, or fire-brick wall, at the back of these tubes, extending upward about two-thirds of their height, forces the gases to pass along the entire tube length. A shelf or apron projecting from the middle of the rear side of this baffle drives the gases against the upper portion of the tubes extending from the feed drum to the mud drum, and forces them along the entire tube surface to a flue back of the mud drum. Of the operation of the boiler the specification says:

"From this description it will be seen that in my boiler each of the water tubes, B, has an independent outlet to the steam and water space above, and also an independent outlet to the mud drum below, the boiler being constructed of wrought metal, and so arranged that the water is forced to pass through the mud drum, and deposits its sediment therein. Only three manholes are necessary for complete access to every part, and the outside of those water tubes on which the soot is formed can be readily cleaned by means of the steam nozzles, H. The two sets of tubes are connected into the upper drums, so as to allow for the expansion and contraction. For this purpose each of the water tubes, B, is curved at one or both ends. The brick arch, D, of the furnace aids materially in the proper combustion of the gases, and the peculiar arrangement of this arch and the fire-brick partition directs the gaseous products of combustion, so that they pass over every part of the heating surface, and so break up the currents as to extract the available heat therefrom."

While the course of the water circulation is not specified in the patent, and while the banks of tubes may at times be subjected to relatively different stages of heat than those assumed below, thereby causing different circulation, yet, as describing the usual main circulation of the boiler shown in the patent now under consideration, we quote the views of Prof. Cooley, complainant's expert, who says:

"It is sufficient for the present to state that the front bank absorbs several times as much heat as the rear bank, and, in consequence, the water is caused to ascend through the front bank with great velocity into the front steam and water drum, where the steam which has been formed in the front bank of the tubes is liberated, the water passing through the connecting water pipes to the rear steam and water drum or feed drum, thence downward again through the rear bank of the tubes to the mud drum. The steam which separated from the water in the front drum may pass through the upper connecting steam pipes to the rear drum, whence it may pass off into the main steam pipe leading from the boiler. This arrangement of drums, tubes, and connecting pipes appears to be a convenient arrangement, and peculiarly adapted to secure this rapid and complete circulation of water with separation of steam, together with a corresponding complete and rapid circulation of gases with abstraction of heat."

Upon this device two claims were allowed, viz.:

"(1) A water-tube boiler consisting of the single mud drum, A, the two elevated steam and water drums, A¹ A², the water tubes, B¹, connecting the water spaces of the steam and water drums; the steam tubes, B², connecting the steam spaces of said steam and water drums, and two sets of water tubes, B B, directly connected, respectively, at their upper ends, with the steam and water drums, and both sets connected at their lower ends with the single mud drum, substantially as described."

"(2) A water-tube boiler consisting of a furnace structure, a single mud drum, A, the two elevated steam and water drums, A¹ A², having their steam and water spaces respectively placed in communication; two sets of water tubes, B B, directly connected, respectively, at their upper ends, with the steam and water drums, and both sets connected at their lower ends with the single mud drum; the fire-brick arch, D, extending over the fire-place from the wall of the furnace structure to the front set of water tubes; and the fire-brick partition C, inclined between the two sets of water tubes, and located between the single mud drum and the two steam and water drums, substantially as described."

Bearing in mind what was well understood in boiler construction at the time Stirling's patents issued, namely, that in a boiler having several banks of rising tubes connected at the ends to drums or headers, there is a circulation upward of water through the tubes exposed to the greatest heat and downward through those exposed to the least, in our judgment the improvements disclosed in the patent and embodied in the claims are set forth and specified in language wholly void of uncertainty. Measured and limited by his own statement, what the patentee disclosed to the public, and what he claimed a limited monopoly for from the public, was to insure the circulation (then well understood) through the mud drum, and secure the deposit of sediment and scale, to compact a boiler into the narrow compass of a triangular structure, and to afford facility for cleaning and repairs. To accomplish these objects we find a structure specified and claimed in which are the elements of "a single mud drum" and "the water tubes, B¹, connecting the water spaces of the steam and water drums." Concededly, the boiler devised by Stirling is a meritorious one, and embodies many desirable points not shown in combination in the previous art; and, assuming for present purposes the novelty and patentability of the combinations claimed, yet, in view of the prior art, the claims are not to be expanded beyond the specified combinations claimed or the substantial equivalents thereof. To an examination of this prior art we now turn. As early as 1871, Griffith and Emery secured patent No. 111,639 for a sectional steam boiler. In it fire-brick baffle walls divide the inclined tubes into thin banks or sections, and cause gases to circulate longitudinally along them, and pass through them back and forth three times. One of the stated objects of the patent is "the arrangement of one or more tubes in each section, wholly or partially out of direct contact with the flames or heated gases, and in such manner as to return the water from one tube head to the other, and thus complete the circulation." The method of doing this and the process of circulation are set forth quite explicitly:

"As the water in the tubes receives heat its density is diminished, and it is forced by the heavier water in the rear tube heads, C, out of the tubes and up the front tube heads, B, into the steam drum, D, where the steam escapes and the water flows over a cross partition or dam, E, and enters the upper

tubes, A¹, which return it to the rear tube head, C, and thus maintain the circulation. The tubes, A¹, in the upper row are wholly or partially screened from the flames and heated gases by the partition, F, made wholly of fire brick or tile. This is done for the reason that, if heat is admitted by the tubes, A¹, the density of the water in the descending current will be diminished, and the rapidity of the circulation correspondingly lessened. By the construction shown, a heavy and light column are continually maintained, the water in the first continually displacing that in the other, and thus making a free circulation. It is not essential that the tubes, A¹, should be entirely screened from the heated gases, but in no case should they receive sufficient heat to form steam bubbles."

This device shows a complete main rectangular circulation, theoretically understood and mechanically applied, and the same stimulated by the distribution and absorption of heat through the agency of bafflers. While the method employed is faulty as compared with Stirling's, in that the hottest gases come in contact with the pipes containing the coldest water, yet that principle was theoretically well understood at the time of the Stirling patent, as evidenced in Rankine's work on the Steam Engine, and was practically applied in the French patent of Grenier, hereafter referred to. Rankine says:

"When heat is to be transferred by convection from one fluid to another through an intervening layer of metal, the motions of the two fluid masses should, if possible, be in opposite directions, in order that the hottest particles of each fluid may be in communication with the hottest particles of the other, and that the minimum difference of temperature between the adjacent particles of the two fluids may be the greatest possible. * * * In a steam boiler it is favorable to economy of fuel that the motion of the water and steam should on the whole be opposite to that of the flame and hot gas from the furnace. Thus, if there is a 'feed-water heater' consisting of a set of tubes through which the water passes to be heated before entering the boiler, that apparatus should be placed in or near the foot of the chimney, so as to be heated by gas that has left the boiler, and thus to employ heat that would otherwise be wasted. The coolest—that is, the lowest—portions of the water in the boiler should, if practicable and convenient, be contiguous to the coolest parts of the furnace and heating surface."

We next find—1875—the first patent to Firmenich, No. 165,222, for a steam generator, which was exhibited at the Centennial Exhibition of 1876, and whose workings were described in subsequent literature of the art. It is a sectional boiler, having upper connected steam and water drums and lower connected mud drums. Between these upper and lower drums are vertical connecting water tubes along which gases are made to travel in two passes by a mediately placed partition wall with a down-take flue. Of the tubes the patent says:

"The last one, or more vertical, heating tubes in each set are embedded in the rear or front wall of the masonry, and, being kept at a considerable lower temperature than the lower tubes, serve as circulating tubes."

The functional action of these circulating tubes is carried into one of the claims, viz.:

"The arrangement, with the steam and water receptacle, D, of the circulating end tubes, C, inclosed by the brick wall or walls, L, and a mud drum, A, situated below the fire line of the steam generator, substantially as described, and as for the uses and purposes set forth."

In describing the prior art in his patent, Stirling, as we have seen in an extract quoted above, stated that in the header type of tubular

boilers there had been no circulation through the mud drum. If inferentially this statement was meant to apply to water-tube boilers with upper and lower drums, it was a mistake, for the Firmenich device certainly shows a main rectangular circulation through a mud drum. In this type we also find an advance in compactness of structure and facility of cleaning over the "header" type. As showing also the vigorous circulation inherent to the general construction, it should be noted that in boilers subsequently built by Firmenich the imbedded rear circulating pipes were found needless, and were omitted, the heat difference between the front and rear vertical tubes being sufficient to produce circulation.

Three years later—1878—we find in Firmenich's second patent, No. 210,312, a further advance in the line subsequently pursued by Stirling. In it we have the first development of the compact triangular or fan-shaped structure of the Stirling patents. In the latter the single mud drum is the center, from which the water tubes and two connected steam and water drums diverge upwardly, while in Firmenich's the conditions are reversed, and the single upper steam and water drum is the center from which the water tubes and two connected mud drums diverge downwardly. In Firmenich's the grate space is within the triangle, and by means of a mediately placed fire-brick partition wall the flames follow longitudinally and in two passes along and across the water tubes, first the front tubes on the upward pass, and next the rear tubes on the downward; while in the Stirling the fire chamber is outside the triangle, and the flame first impinges transversely on all the tubes on one side of the triangle, and next on all the tubes on the other. While no mention is made in the patent of the circulation, yet, as that principle was well understood in the art, and was set forth, as we have seen, in the prior Firmenich patent, and as the later patent states "the invention has special reference to improvements upon our recently patented steam generators," the principle of circulation may be assumed as a constituent part of the device shown in the second patent. In it, therefore, we find a main circulation of such strength from the inherent character of construction that the down-flow pipes of prior constructions, imbedded in walls to subject them to less heat than that of the combustion chamber, were dispensed with, and the structure adapted in its several parts to absorb all the heat possible in the chamber. We find also the circulation through the mud drums, and, indeed, the two mud drums connected by a pipe which, from its relative scale size, as shown in the drawing, and from its being deemed worthy of mention in the specification, was obviously not a mere supply pipe for water which every boiler must have, but must have had a functional duty in the subsequent operations of the structure. The statement in Stirling's patent that "water-tube boilers, as heretofore constructed, have also been found objectionable because of the large space which they occupy, and the large number of hand-holes with covers and bolts necessary to get at the inside of the tubes for cleaning," if meant to apply to boilers other than the header type, is not a correct statement of the prior art, for in this

later Firmenich device we have a compactness of structure akin to that of Stirling, and also access for cleaning by the same number of manholes, and in the same way. The proofs show that Firmenich boilers, built substantially on the lines of the first patent, have been in highly successful operation at the American Cutlery Works in Chicago for upwards of 16 years; that they have not required any repairs of moment in 10 years; that no scale forms on the tubes, and scrapers are not required to clean them; that they are washed with hose, and entrance is had through a manhole at the end of each drum. But the development did not cease with these patents. In 1880 we find the Fowler boiler of patent No. 233,228. While it has faulty features, yet, on the whole, it contains evidence of advance. In its two upper and two lower drums we have a departure from the compact triangular construction first shown, but we note for the first time several features which were afterwards modified and carried forward in the Stirling. The cylinders are placed at right angles to the course of the flames, as the patent says, "to cause the flames and gases to break up and pass around among the tubes." We also find the water tubes are bent at both ends, for the express purpose of "spreading out and affording room for the action of the products of combustion," "of entering the shells at the proper angle," and to counteract the "injurious effects of the expansion and contraction of the tubes under variations of temperature." We also note for the first time the forward pitch of the water tubes and upper cylinder so as to be over the flame, and the backward pitch of the furnace wall facing them, or, as the patent expresses it:

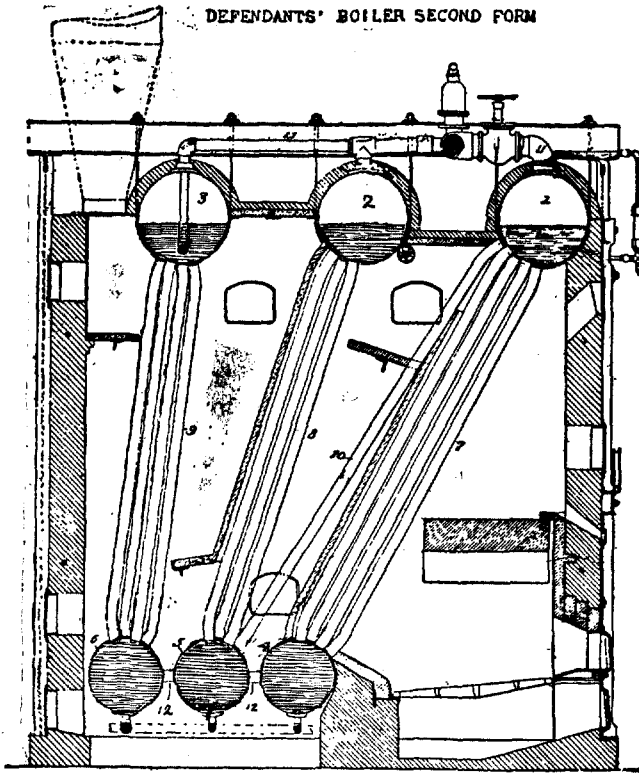
"The front and back walls are vertical, as shown at d, d, to a point above the level of the fire door, from which point they incline toward the top cylinders at about the same angles as that at which the cylinders are set. I thus obtain room for a large furnace which is so inclined as to force all the flames toward the boiler tubes, and also bring the tubes, to a certain extent, over the fire."

The steam spaces, but not the water spaces, of the upper drums are connected, and there are imbedded side pipes at each end "to provide for the downflow of the water." It would also appear that, although there was a connection between the mud drums, the main circulation was not crosswise through it, but that there were two rectangular main circulations endwise through each bank of tubes to their respective connecting upper drums down the side pipes to the mud drums, and through them to the water tubes again. In the inclination of the furnace wall we have a step forward towards the perfected function of the retarding brick arch over the fire chamber in Stirling's patent, which, however, in 1888, was shown by Hanrez in the arch V of his patent No. 384,972.

This brief review of the art, which by no means embraces all the patents pertinent thereto, and the satisfactory character of the results attained in the same general lines which Stirling followed some years later, show the field was so fully occupied that the advance made by him was the gradual step of the improver, not the stride of the pioneer. Singly considered, the elements of

his combination were old. He did not discover the principle of circulation, nor was he the first to devise means to effect it; circulation through a mud drum was not original with him; bafflers and means for effectually distributing the heat to the water tubes were known before; compactness of structure and facility of access for cleaning had been attained, and the deposit of scale secured. That he united all these desirable points in a structure combining simplicity, economy, and effectiveness is true; that his combination showed novelty and patentability is, for present purposes, assumed; and to the extent of his specified combinations, and to others using substantially the same elements, or their equivalents, to accomplish the same result in substantially the same way, his rights will be enforced. Further than this we cannot go, nor are his claims entitled to a broader construction.

Construing the claims thus, we turn to the question whether infringement is shown? It is needless to consider respondents' first form of boiler. It was never manufactured or sold, and all purpose to do so was long since abandoned. In the second form there are three connected mud drums, from which three banks of water tubes extend to three upper cylinders, the steam, but not the water, spaces of which are connected. From the water space of the front



upper drum a bank of tubes, designated in the proofs as "tubes 10," pass back of the baffler wall, and enter the second mud drum. An additional baffler wall is placed back of the middle bank, by means of which the flames are carried down and go in a third pass through and along the water tubes connecting the rear drums. Of this construction complainant's principal expert says: "In the defendants' boiler shown we find in the three connected mud drums an equivalent of the single mud drum shown in the Stirling patent." If this be true, then, to our mind, the most vital and marked feature of the Stirling device is gone. We lose at once the compactness of structure, the economy of construction, the small number of man-holes, and the triangular circulation, which differentiated it from prior structures, and constituted the grounds of alleged novelty. If the single drum is the same as three connected mud drums, then, manifestly, we sap away the life of the Stirling patent, for how could it have issued in view of the prior art, if this be true? But the three mud drums are not the same as one. Conceding the rear drum performs no necessarily individual functional part, that it could be dispensed with, and the tubes from the rearmost upper drums carried into the middle mud drum, the fact still remains, the functional operations of the two remaining mud drums are not the same. The expert for complainant admits, if tubes 10 were introduced into the front drum instead of the second drum, it would make a substantial difference in principle. If this be so, and if, consequently, each of these mud drums exerts a separate, distinct, and individual function, owing to their separation and relative relation to other parts, how can it be said that their separation is a matter of indifference, and that the sum of their individual and separate functions is the function of the single mud drum of the Stirling patent? If infringement occurs when tubes 10 enter drum 5, and noninfringement when they enter drum 4, what follows when the drums are merged in the single drum of the Stirling construction, and tubes 10 enter it? Does the substituted single drum take upon itself the infringing character of drum 5 or the noninfringing of drum 4? But, apart from all theory and speculation in this regard, the all-sufficient answer is that complainant limited his claims by the element of a single mud drum, and the claim means just what it says. "The claim is a statutory requirement, prescribed for the very purpose of making the patentee define precisely what his invention is; and it is unjust to the public, as well as an evasion of the law, to construe it in a manner different from the plain import of its terms." *White v. Dunbar*, 119 U. S. 47, 7 Sup. Ct. 72; *Stutz v. Robson*, 54 Fed. 506; and *Keystone Bridge Co. v. Phoenix Iron Co.*, 95 U. S. 274. So, also, we do not find in respondents' device "the water tube, B¹, connecting the water spaces of the steam and water drums." Can language be more explicit than these words? Can there be any doubt what the patentee meant, specified, claimed? The words "tube" and "connecting" when applied to two inclosures, imply passage from the one to the other through the medium of such tube. There can be no doubt what the connecting water tubes specified by the patentee

were, and their function is explicitly stated by Prof. Cooley, who says:

"The circulation of water is as follows: The feed water enters the rear upper drum, and passes thence down through the feed-water tubes to the mud drum. It then passes forward and up through the front bank of tubes to the front steam and water drum, thence back through the connecting water pipes into the feed-water drum, again down into the mud drum; forward and up through the front bank of tubes, and so on continuously. * * * This arrangement of drums, tubes, and connecting pipes appears to be a convenient arrangement, and peculiarly adapted to secure this rapid and complete circulation of water," etc.

In point of fact such a connecting tube in form does not exist in respondents' boiler. Does it in substance? Its equivalent is found by complainant's experts in tubes 10, the mud drum 5, and the front tubes of bank 8, and the triangular circuit found in Stirling's device is claimed to exist in respondents' structure from the front mud drum up tubes 7 to front drum 1; thence down tubes 10 to mud drum 5; thence up the front tubes of bank 8 to steam and water drum 2; thence down the rear tubes of bank 8 to steam drum 5; thence through nipple 12 to mud drum 4, the starting point; and thence forward in circuit.

Conceding, what we are by no means prepared to concede under the prior art, and in the absence of all mention of a triangular circulation in Stirling's patent, that the double quadrilateral circulation as alleged above could be held, in substance, the equivalent of the triangular circulation of the Stirling structure, does such circulation exist? In this connection we cannot too strongly emphasize the law that the burden of affirmatively establishing the fact of its actual existence—not of its mere possibility or probability—rests on the complainant. Does a fair preponderance of the proofs affirmatively show this? Without at length reciting or analyzing the testimony on that point, or without discussing the experiments and tests which are alleged to be confirmatory of the existence of such a circulation, all of which we have patiently considered, we are satisfied that the complainant has not met the burden of proof imposed upon it by the law, and has not shown by a preponderance of proof that the circulation alleged by it does take place in respondents' boiler. Indeed, the weight of the testimony in this regard is, in our judgment, with respondents. Such being the case, infringement of the first claim of the patent has not been shown, nor, in our view, has infringement of the second claim been established. In it we find "the single mud drum, A," and "the two elevated steam and water drums, A¹, A², having their steam and water spaces respectively placed in communication." This latter element, under the prior art and the specification, we must construe as meaning the connecting steam and water tubes of the prior claim. Thus construing the claim, infringement has not been shown.

The same conclusion must follow with the second patent. It is expressly stated to embody "certain improvements in that class of steam boilers, which I have described in letters patent No. 407,260." To the construction therein shown there is added a third upper drum, A³, used as a feed-water heater, connected to the next

forward steam and water drum by a steam pipe, b^3 , and to the single mud drum, A, by water tubes, B^3 , along which the gases are made to travel by an additional baffle placed back of the tubes, connecting the mud drum, A, and the upper drum, A^2 . It specifically refers to the steam and water drums as connected "with each other by steam pipes, b^1 , and water pipes, b^2 ." There is no mention of a triangular circulation, and the only reference to circulation is what would possibly be purely local ones, respectively, in the tubes connecting the mud drums with the two forward steam and water drums, viz. the water "enters the mud drum, A, in a heated state, and from the drum the water rises through the tubes, B^1 , B^2 , into the drums, A^1 and A^2 , and it reaches these drums comparatively free from mud." In this patent two claims were allowed, viz.:

"(1) A water-tube boiler consisting of a single mud drum, A, two elevated steam and water drums, A^1 A^2 , having their steam and water spaces, respectively, placed in communication; the water tubes, B^1 B^2 , extending from the mud drum to the drums, A^1 A^2 ; the feed drum, A^3 ; the water tubes, B^3 , extending from the mud drums to the feed drums; and the pipes b^3 , connecting the feed drum with one of the steam and water drums,—substantially as described."

"(2) A water-tube boiler consisting of a furnace structure, a single mud drum, A; the elevated steam and water drums, A^1 A^2 , having their steam and water spaces respectively placed in communication; two sets of water tubes, B^1 B^2 , directly connected at their upper ends with the steam and water drums, and both sets connected at their lower end with the single mud drum; the feed drum, A^3 ; the water tubes, B^3 , connecting the feed drum with the mud drum; the brick arch, D, extending over the fire place, from the wall of the furnace structure, close to the front set of water tubes, B^1 ; the fire-brick partition, C, inclined between the two sets of water tubes, B^1 B^2 ; and the fire-brick partition E, situated between the water tubes, B^2 and B^3 ,—substantially as described."

The additions thus made to the former device were not in themselves novel. Rankine, as we have already seen, had taught that in boiler construction the motion of the steam and water should, on the whole, be opposite to that of the flame and hot gases of the furnace, and had advocated placing feed-water heaters in the line of gas leaving the boiler. The French patent of Grenier, No. 153,938 (1883), went a step further, and showed in a water-tube boiler a progressive circulation of water forward from the rear, and a circulation of the gases in the opposite direction, and the feed-water section made an integral part of the boiler itself.

In view of what has existed in the art, in which must be included the first patent to Stirling himself (*James v. Campbell*, 104 U. S. 382; *McCreary v. Canal Co.*, 141 U. S. 459, 12 Sup. Ct. 40), the only novelty shown was in the combination claimed. As we read the claims, "the single mud drum, A," is an express element, and "the elevated steam and water drums, A^1 , A^2 , having their steam and water spaces respectively placed in communication," must be construed as noted in disposing of the second claim of the first patent.

The views expressed heretofore render needless a discussion of respondents' third form of boiler. What has been already said applies to it, with the additional fact that the rearmost of its three

lower drums is disconnected entirely from the mud drum adjoining it. They are separate and separated chambers, with individual functions, and receive separate deposits of scale and sediment. The water once in mud drum 5 could never pass again through drum 6.

On the whole case, we are of opinion infringement has not been shown, and the bill must be dismissed. Let such a decree be drawn.

I am authorized by Judge ACHESON to note his concurrence.

THE ADVANCE.

THE ALLIANCA.

THE VIGILANCIA.

THE SEGURANCIA.

HUNTINGTON et al. v. PROCEEDS OF THE ADVANCE. SAME v. PROCEEDS OF THE ALLIANCA. SAME v. PROCEEDS OF THE VIGILANCIA. SAME v. PROCEEDS OF THE SEGURANCIA.

(Circuit Court of Appeals, Second Circuit. March 3, 1896.)

SHIPPING—EQUITABLE LIEN—EXPRESS CONTRACT.

One who, in the home port, at the request of the owner, and for the purpose of preventing seizure and sale of the vessels in a foreign port, guaranties letters of credit, upon an express contract which gives him a lien on the freight alone, does not thereby acquire an equitable lien, superior to a prior mortgage, on the vessels themselves, even if he supposed at the time that he would have a maritime lien on both freight and vessels.

Appeal from the District Court of the United States for the Southern District of New York.

This was a petition by Collis P. Huntington and Pratt & Co. to assert an equitable lien against the proceeds of the steamships Advance, Allianca, Vigilancia, and Segurancia. The district court dismissed the petition, and the petitioners appeal.

Robt. D. Benedict and Maxwell Evarts, for appellants.

Lewis Cass Ledyard and Walter F. Taylor, for appellees.

Before WALLACE, LACOMBE, and SHIPMAN, Circuit Judges.

SHIPMAN, Circuit Judge. After the district court dismissed the petitions of C. P. Huntington and Pratt & Co., which were founded upon an alleged maritime lien upon the proceeds of the Advance, Allianca, and Vigilancia (see 63 Fed. 726, affirmed in 72 Fed. 793), the same petitioners filed in the district court a petition which, relying upon the same facts as those previously set forth, asserted that they constituted an equitable lien upon the proceeds of the same three vessels, and of the Segurancia, another steamer of the same line, and prayed that such equitable lien might be preferred in order of payment to the lien of the mortgage. From the decree of the district court, which dismissed the petition, this appeal was taken.

The district court referred the petition to a commissioner, to take proof of the allegations which it contained, and the record shows that