

outer ends of said radiating tubes, and extending from near the water line to the bottom of the central boiler, and communicating therewith at their ends through horizontal pipes."

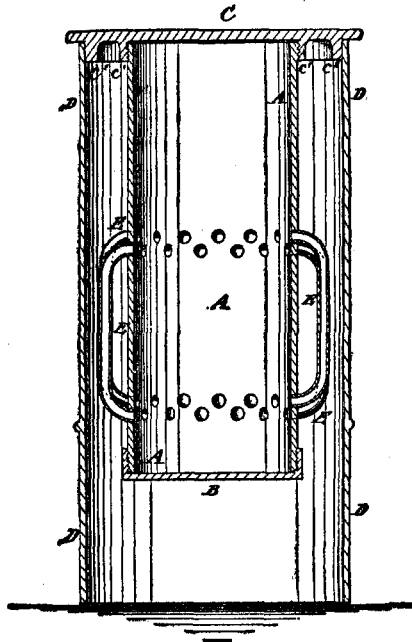
These radiating tubes are in the specification said to have the following purpose:

"A maximum fire surface is obtained in a given space, and great economies in fuel are thereby made possible."

Hence the office of the tubes was to furnish greater heating surface. It appears from the evidence of Mr. Kennedy, the president of the company owning the Hazleton patent, that, after erecting one boiler with the circulating tubes, they became filled with mud, developed leaks, and were abandoned.

It is convenient in this order to examine the patent for which letters (No. 171,017) were issued to Heaton in 1875, for a new and useful improvement in upright tubular boilers. The claim makes no reference to tubes collaterally applied to the boiler, but the description provides:

"E are a set of upright tubes placed at a little distance from the lower part of the shell of the boiler, H, and the upper and lower ends of which are bent inward, pass through, and are secured in holes in the shell of the said boiler, H, so that the water in the boiler may circulate freely through the said tubes. With this construction, the products of combustion, as they pass up around the boiler, H, also pass around the tubes, E, so that the water may be in contact with a very large heating surface, and may thus generate steam very rapidly."



The grate in this instance was not annular, and although the device of tubes, which were incidents of the invention, assured an increased heating surface, they also aimed at circulation of the water. The description in the specification makes no suggestion of tubes alternating in length, or inclining to the axis of the cylinder, but the figure shows vertical tubes, the ends of one set entering the cylinder, one above and one below the ends of the adjoining tube.

Attention was also called to the Rogers & Black patents. The letters covering these were numbered 41,323 (reissue 2,130), 55,539, 65,280, 65,281. All of these patents, either by the illustrative figure, or the description in the specifications, suggest these features: (1) The boiler is placed over the grate; (2) tubes, one end inserted at the lower and the other end at the upper portion of the boiler; (3) these tubes may be so arranged that the end or ends of some of the tubes enter the boiler nearer its end than do the end or ends of other tubes; (4) the tubes may be vertical, or spirally or helically inclined; (5) the function of the tubes is to present a greater heating surface, and to afford a medium for the uniform circulation of water within the boiler. As these Rogers & Black patents, beginning in 1865, follow each other to May 28, 1867, the persistent effort on the part of the inventors is to bring the upper ends of the tubes near to the water line above, and the lower ends nearer the inferior end of the boiler, and to avoid abrupt bending of the ends of the tubes, and to give to "the tubes a gentle curvature or bow shape along their length," which was beneficial when the tubes were expanded by heat. Upon examining these inventions, the consideration is suggested that the inventors had no conception that entering the tubes at different levels of the cylinder would have any other effect than to prevent impairment of the strength of the boiler. Hence the preservation of the strength of the boiler prompted the arrangement of tubes. Thus, in letters 41,323 it is said:

"By connecting the upper ends of the tubes, B, to the boiler at points above those where the tubes, B', are secured, and by adopting the same plan with the lower ends of the tubes, the piercing of the body of the boiler at points too near each other is avoided, and a great number of tubes are obtained without wounding the boiler."

This concern for the strength of the boiler, and the consequent alteration in the length of the tubes, is illustrated in the specifications of letters 55,539. It is doubtful whether the inventors conceived that the fire acting upon the flues would produce circulation, although it might permit the same. Thus, letters 41,323 (reissue 2,130) show that it was considered and claimed that a circulation of water between the upper and lower portion of the boiler would be obtained by means of the boiler and attached tubes, although it would seem that it was thought that the tubes would rather permit circulation, than aid in causing it. It is also suggested (see letters 41,323) that the tubes may be used in a spiral or inclined position, "as they tend to direct the products of combustion in a spiral course to the chimney, and to thereby increase the heating action on the boiler." The Rogers & Black boiler was tested at the Philadelphia Exhibition, and showed a very high rate of evaporation per square foot of heating surface,

but the lowest degree of evaporation per pound of coal from actual temperature and pressure; and, if the experiment of Prof. Morton is to be accepted, the tubes employed in connection with the Rogers & Black boiler furnished a relatively very inferior extent of productive heating surface.

It now becomes important to consider whether these letters patent enumerated anticipated Morrin's alleged invention. On reference to the specifications connected with letters patent 309,727, issued to Morrin, the following facts appear: (1) The invention relates to a vertical "generator shell provided with lateral tubular branches arranged within a furnace shell, provided with annular grate or fire bed"; (2) the improvement aims at the production of free circulation through numerous tubular branches, extended and efficient heating surface, etc. This result, which seems to have been sought in the manufacture of boilers, the complainant claimed to have attained by adjusting into upright generating cylinders, with annular grates, series of tiers of tubes, arranged one above the other, whose ends should enter, one an inner and the other the outer of two concentric cylinders. It was further conceived that the tubes should be staggered, and set obliquely to the axis of the cylinder. The object of staggering the tubes was, not to preserve the strength of the boiler, and not merely to permit circulation, but to furnish an active, concurring cause of circulation. In the case of the Rogers & Black patents, the arrangement of the tubes into long and short series was to save wounding the boiler and impairing its strength. In the Morrin boiler, the tubes were to become agents of circulation, by compressing many of them in overlapping tiers, within a small area, and they were to have such form and inclination as would enable them to receive and impart the maximum heat, and expedite circulation to the degree of highest usefulness. Hence the specifications (Exhibit No. 2) contemplated double cylinders rising to such height as in a perfected state should furnish the power desired, and from it should radiate double-branched and overlapped tubes, tier upon tier, inclined so as best to receive the heat that arose from the annular fire bed beneath. This was the machine intended, and is the machine for which the second claim of the Morrin & Scott patent provided. It is true that the second claim does not show that the generator cylinder should be vertical, surrounded by an annular grate, or that the tubes should be obliquely arranged; but the description shows it fully, both by words and illustrative figures, and reference is made to these by the words of the claim, "substantially as set forth." By the subsequent patent (letters 463,307, Exhibit 4), it is provided that the ends of the tubes shall enter a single cylinder to an equal extent, and a particular form of tube is claimed. Hence the machine is complete, and a combination of an annular grate, with tubes in form unlike others before fashioned or described, arranged in tiers not before described, to perform functions not before suggested, is covered by the terms of the letters. The result is a machine which so competent a judge as Mr. Edison pronounces the "best boiler yet invented." Increased heating surface and more active circulation have been desiderata in boiler manufacture for many years, and it cannot be denied that

Rogers & Black, and also Heaton, sought the results by a boiler placed over a fire bed, and by the use of radial tubes. But the chief resemblance is that the tubes had two ends entering the cylinder, and that the tubes, to save the boiler, entered it at different levels, and a spiral or helical form was suggested, to give the products of combustion a spiral direction to the chimney. But a machine, compressing within a narrow shell tubes in proximate and interlocking tiers, laid obliquely about an upright cylinder, so as to obtain the greatest amount of impinging heat, and thereby begetting circulation and consequent rapid and economic heating, in the estimation of the court, was never created before the Morrin & Scott invention. The specifications in their first patent (Exhibit 2) show that they saw with distinctness the combination, the parts to be used, the function of each part, and the harmonious working of the whole. In the second patent, the availability of a single cylinder was developed, and it is not apparent that this was anticipated by the specifications of the first patent. The defendants contend that the use of the ogee form in both branches of the tube is not an infringement, and that such form is not patentable. The ogee tube seems to have the precise form that gives the most beneficial results. If a tube bent into any form would not show invention, upon the theory that change of the simple vertical form with curved ends, to any other shape, was but a change in degree, and what any skillful mechanic could do, then there is no invention. But, as in the case of the whole machine, Morrin developed a perfect machine, where all others seeking the same end had tried and failed; and, although skilled mechanics abound, no one had conceived the ogee form of tube, and, when Morrin invented it, it was so faultless that the defendants appropriated and employed it in duplication in the machine manufactured by them. The obvious condition is that the defendants have copied the complainant's machine, and have done so because it had obtained and deserved a supreme commercial reputation and value; and it is equally obvious that such a machine had no existence before its development by Morrin & Scott, although previous inventors had, with a view of permitting circulation between the top of the boiler, employed radial tubes, and that too with limited success, and had used tubes of different lengths for the prudential purpose of preserving the boiler, and had suggested spiral tubes to give the products of combustion a spiral course towards the chimney. This use of parts in a manner and form and for a function so entirely different from that existing in the case of the complainant's boiler does not, it is considered, furnish a shield for the defendants.

The next inquiry relates to the outer casing of the boiler, which the defendants have appropriated literally. It is proved and admitted that every component part is old and without novelty. The complainant, Morrin, had a problem to solve. He wished to provide a casing for an upright, steam-generating cylinder, about whose body should cluster ascending tiers of interlocking tubes, which should receive the direct impinge of the heat from an annular fire bed located directly under them. This casing must contain the heat within these tubes. This necessitates durability and immunity from burning. If one of the many tubes should leak at a joint or elsewhere, some ar-

rangement must exist to enable it to be located and repaired without removal of the entire casing. This required divisions of the casing. Such divisions necessitated devices for combining the parts, and the establishment of an extended vertical structure in such manner that a part could be removed,—demanded means of so attaching the parts that they could be conveniently separated, and yet possess strength in combination. Morrin studied and fashioned a series of drums, and placed one upon the other, and he gave them flanges at either end, so that each could be bolted to its neighbor, and each drum was composed of sections flanged outwardly so that they could be bolted together, and he lined each section with removable fire bricks. There was his perfected structure placed about the boiler in parts, marshaled into a completed and secured whole, with each part and subpart capable of severance, and held and braced in position by the outwardly extending flanges. The defendants deny to this combination invention or novelty, because similar flanges had been used before to hold component parts of machinery in combination, and because fire bricks had been used customarily to defend the walls of furnaces and similar structures; and it is urged that any skillful mechanic would have achieved the combination, if the duty had been demanded of him. The demand for casings for vertical boilers had been long existing. Why had it not been met? Because, with numerous brains undoubtedly considering it, no brain had studied out this plan, which up to this time is apparently of superlative benefit. All these parts, old in themselves, have been summoned to take new forms, and, as parts of a harmonious whole, to aid in a new function. To these parts the defendants have added nothing, from them they have subtracted nothing, as if the previous combination were at the very point of useful and perfect arrangement. This is not merely an aggregation of parts for new use. They have a new action or duty. The flanged extremities of the several plates exist, not only as separable joints, but also act as supporting and bracing arms for the different parts, securing the casing in position under the operation of the furnaces. Sectional drums have been long used, but it is not shown that they have been superimposed, and made removable in whole, or in the several sections composing them, to turn back heat into the radiating tubes of a boiler, and for that purpose lined with fire bricks fitted to the several separable parts. The combination as a whole performs a duty that no combination of such parts has performed before, and that gives it patentability. The law intends that the patent shall be preserved, unless its invalidity appear beyond a reasonable doubt; and when a machine created pursuant to the specifications of letters patent has reached in its domain the greatest distinction for useful operation, while others who have sought the same ends have failed substantially, and when the rights are of great pecuniary value, and have enlisted large financial undertakings, a court of equity should not be diligent to discover nice resemblances to former inventions, especially in behalf of a person who had recognized its validity through years of service in commending it to the public, and whose own signature acknowledged its validity.

The conclusion of the court is that the defendants have infringed

the rights secured to the complainants concerning the combined machine covered by the second claim of the first patent (letters patent Exhibit 2), and the first and second claim of letters patent Exhibit 4, and have infringed the rights concerning the shape of the tubes, secured to the complainant by the second claim of letters patent Exhibit 4, and have infringed the rights concerning the improvements in sectional casings secured to the complainant by letters patent 463,308 (Exhibit 5). Decrees will be prepared pursuant to this opinion, and settled upon the usual notice.

OREGON R. R. & NAV. CO. et al. v. BALFOUR et al.

(Circuit Court of Appeals, Ninth Circuit. October 3, 1898.)

No. 435.

1. ADMIRALTY—SUIT BY SHIPOWNER TO LIMIT LIABILITY—POWERS OF COURT.

The powers of an admiralty court in proceedings instituted by shipowners, under Rev. St. §§ 4283, 4284, to limit their liability, are as extensive, and its remedies are as effective, as are those of a court of chancery, where its jurisdiction is invoked in an equitable proceeding.

2. SAME—FAILURE TO SURRENDER VESSEL LIABLE—POWER OF COURT TO SEIZE.

Where shipowners have invoked the jurisdiction of a court of admiralty by a petition to limit their liability, under Rev. St. §§ 4283, 4284, and, having thereby secured the stay of proceedings by libelants, surrender but one of two vessels held by the court to be liable, the court, having full equitable powers to adjust the rights of all parties interested, is not bound to dismiss the proceedings for that reason, but may by its own process, or its own order, seize the other vessel, and make distribution of the entire fund which it was the duty of the petitioners to tender by their petition; and such is the proper, and only equitable, course, where, by reason of the proceedings, suits by libelants have been delayed for a number of years, during which the shipowners have become insolvent.

3. SAME—MANNER OF SEIZURE.

It is not material in such case, where the vessel has been brought into court, and her owner has stipulated to pay her appraised value, whether or not she was brought in by the appropriate process.

4. CORPORATIONS—REORGANIZATION—NEW CORPORATION AS PURCHASER WITHOUT NOTICE.

A reorganized corporation, having the same officers and attorneys as the old, and succeeding to its property by purchase at a receiver's sale, is not a purchaser of such property without notice of the rights therein of parties to pending litigation between them and the old corporation involving the right to a lien on such property, and cannot relitigate in such suit questions which have been adjudicated as against the old corporation.

5. ADMIRALTY—SUIT TO LIMIT LIABILITY—DISTRIBUTION OF FUND.

Where, in proceedings on the petition of shipowners to limit their liability to libelants of a vessel, their petition is granted, and the fund in court is insufficient to pay in full the amount found due to one defendant, the petitioners cannot complain that a portion of it is erroneously distributed to other claimants.

6. RES JUDICATA—QUESTIONS NOT RAISED ON FORMER APPEAL.

In a suit by shipowners, under the statute, to limit their liability to certain libelants of vessels, the court adjudicated the claims of the defendants, and distributed between them the fund in court. An appeal was taken by the defendants, and the decree was reversed, on the ground