

HANCOCK INSPIRATOR CO. *v.* LALLY.¹*Circuit Court, N. D. Illinois.*

March 22, 1886.

1. PATENTS FOR
INVENTIONS—NOVELTY—INSPIRATORS.

The third claim of letters patent No. 185,861, granted January 9, 1877, to John T. Hancock, for an improvement in inspirators, is void for want of patentable novelty over the Giffard English and French patents of 1858, for injectors, and the English patent of Barclay and Morton of November, 1863.

2. SAME.

“Lifters” and “forcers” arranged in an axial line with reference to each other, for injecting water into a steam-boiler, being old at the date of the Hancock patent, and no special advantage being shown to have accrued by the arrangement of the two devices side by side, as provided in the patent, held, there was no invention in such arrangement.

3. SAME—CERTAINTY OF DESCRIPTION.

In order to save this patent from being void for lack of certainty in description of the devices covered by this third claim, it is necessary to assume that ⁸⁹ their construction was a matter of common knowledge in the art when it was applied for, and in this view the mere arrangement of these devices in a new relation to each other did not involve invention.

In Equity.

Elmer P. Howe and *Chauncey Smith*, for complainant.

Rodney Mason and *B. F. Thurston*, for defendant.

BLODGETT, J. This bill is brought to restrain the alleged infringement of letters patent No. 185,861, granted January 2, 1877, to John T. Hancock, for “an improvement in inspirators.” This patent belongs to that class of devices of comparatively recent origin which are arranged to force a jet of feed-water into a boiler by the direct action of the steam of the boiler. The patentee says in his specifications:

“The object of my invention is—*First*, to supply water to a boiler by a less expenditure of power than that required for a pump, and consequently with a relative saving of fuel; *secondly*, to draw the required quantity of water, by means of the attractive power of steam acting in one part of my apparatus, from the greatest depth which a pump is capable of doing, and to deliver the same to another part of my apparatus in quantity equal to what the said part requires at all varying pressure of steam, from zero upwards, and with reasonable variations in the temperature of the water; *thirdly*, to regulate the supply of water to the requirements of a boiler, even when the apparatus is exposed to sudden jars or shocks, thus insuring a constant and reliable feed. * * * My invention consists in the employment and combination of two sets of apparatus, contained each in a separate chamber, the one being employed for lifting water from a well or other source of supply, and conveying the same to the other chamber, from whence it is conducted to the boiler.”

The patent contains five claims, but the allegation of infringement in this case only applies to the third claim, which is as follows: “The combination of an injector for forcing water into a boiler, and a second injector communicating with the well, and communicating with and supplying water to the first, substantially as described.”

In 1858, Henry Jaques Giffard obtained patents in France and England for a device for forcing water into a steam-boiler, the first form of which is substantially like either of the devices which Hancock has coupled together to make what he calls his “inspirator.” The instrument went into general use, and was patented in this country, and a large number of patented improvements upon the original device of Giffard are shown by the proof to have been taken prior to the date of the invention claimed in this patent. The

operation of the original Giffard invention depended upon a few simple mechanical principles. It is well known that if a pipe be extended into a well or reservoir containing water, and steam be let into this pipe so as to expel the air, or remove the atmospheric pressure for the time being, the water will rise in the pipe to the same height that it would in the ordinary suction pump. The steam has no attractive power to draw the water, but the water is raised solely by atmospheric pressure. Organized simply upon this principle, the Giffard device is what may be called merely a lifter; that is, it takes the atmospheric 90 pressure off the pipe leading into the reservoir, and allows the water to be forced, by the weight of the atmosphere, into the pipes of the injector or lifter to the extent to which the atmospheric pressure will accomplish this purpose. It had been, long before this patentee entered the field, demonstrated and become a part of the common mechanical knowledge of those versed in the art that, to make a lifter of this instrument, the area of the combining tube at its smallest diameter must be greater than the area of the steam-jet which is to expel the air from the combining tube to cause a flow of water into the same; while, in order to impart to the stream an increased momentum or velocity, so as to make the instrument a forcer, the area of the steam-jet must exceed the area of the combining tube at its smallest diameter. In other words, if the combining tube of the lifter is made smaller than the area of the steam-jet, the steam cannot escape through the combining tube, but will recoil, and hinder, if it does not wholly prevent, the flow of water into and through the combining tube; while the current through the latter being established by the lifter, the volume of steam from the forcing jet must then be made large enough to impart its velocity to the current of water in the combining tube, so as to send the water with increased momentum into the boiler. Another

characteristic of all these devices, known before the invention of this patentee, was the fact that, in order to make the instrument operative, there must be an opening somewhere beyond the end of the combining tube, through which the air to be expelled therefrom, and the steam and water first admitted, could pass, in order, as it was commonly expressed, to prime the instrument and get sufficient head or velocity upon it to enable it to act against and overcome the pressure of the boiler, and drive the water into it.

In the English patent Giffard showed by the second drawing a device by which the jet or stream of water, which had been sent into and through the combining tube by the action of the lifter, received another jet of steam, giving it the increased impetus necessary to drive the water into the boiler; these tubes of Giffard being arranged in an axial line to each other,—that is, the second tube, upon which the forcing jet of steam is applied, is directly in the line of the combining tube, which receives the jet of steam, and causes the water to be lifted. In the first form of the Giffard injector the instrument is so constructed that the jet of steam first applied is smaller than the area of the combining tube, and hence, in its first operation, the instrument is a lifter; but after the air has been expelled, and the instrument become primed, and a flow of water established through the combining tube by the operation of the instrument as a lifter, the area of the steam-jet is enlarged so that from that time forward the instrument operates as a forcer; that is, the original simple Giffard injector in its first form, as shown in his French and English patents, was a combined lifter and injector. He says:

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“This apparatus, which may be considerably modified without changing the principle of its action, consists, according to one arrangement, as applied to a steam-boiler, of a steam-jet or injection pipe,

which receives steam from the boiler, and directs it in a continuous jet into a small passage, the lower end or mouth of which is expanded sufficiently to admit of the entrance of a stream of water which, by surrounding the steam-jet pipe, forms an annular jet of water, with the steam-jet in the center; * * * or two steam and water jets may be used in such cases, such as where the condensation of the steam is not sufficiently rapid, owing to the heated state of the water in the hot well or tank of the engine. * * * In case the initial temperature of the water in the well or reservoir (or tender, when applied to locomotive engines) should be too high, which cannot always be avoided, to condense the entire quantity of steam issuing from the nozzle it would be requisite to divide the actuating steam-jet into two parts, as shown in Fig. 2; the first portion acting as above described, drawing up the water, and imparting to it only a fraction of the necessary speed; and the second portion, arriving by the pipe, t, and having its annular sectional form regulated by the screw, w, would impart to the vein or jet a fresh impulse in the diverging mouth-piece, to any point where the ejected water would still possess a portion of the pressure of the boiler. Now, with this portion of the pressure above the pressure of the atmosphere, the water could condense the fresh amount of steam, which would then no longer act except with the difference of the total pressure already acquired, and would thus be introduced into the boiler under the most favorable conditions. This principle may be modified and worked out in various ways."

It will thus be seen that Giffard, in his original patent, suggested and showed the application of a second jet of steam, to act as a forcer upon the column of water which had been raised by the action of the lifting portion of the device.

In the English patent of Barclay and Morton, issued in November, 1863, an injector or “lifter” is shown, of which they say:

“It may be necessary to combine two of the before-mentioned apparatuses, so that the one may merely raise or lift the water or the other fluids, while the other then merely forces it; and also one lifting apparatus may be combined with that known as ‘Giffard’s Injector,’ and by this means supply water to steam-boilers from any depth where an ordinary lift-pump is required.”

Without traveling through the large volume of testimony in the record in this case, it is enough to say the proof shows that when Hancock entered the field lifters were old, and forcers were old; that is, Giffard showed a forcer working in connection with his lifter, and also that his simple lifters were transformed, when they had once got into operation as lifters, into forcers. It seems to me that all that Hancock did was to take the forcer, which Giffard had arranged in a direct line with the tubes of his (Giffard’s) lifter, and arrange or set this forcer along-side of the lifter, instead of allowing it to extend beyond, in the same line with the lifting pipe; and, when thus arranged, the forcer of Hancock performed the same function that was performed by the injector of Giffard after the lifter had set the column of water flowing into and through the tubes, when, the steam-jet being increased, the instrument became from that time a forcer. No new function is performed by either instrument in the change of position, 92 but the two continue to do, in the Hancock combination, just what they had done in the Giffard combination, and just what Barclay and Morton suggested they might be made to do in their device.

It is also noticeable that while the proof shows that the law of the operation of this device as a lifter and a forcer was well known at the time Hancock entered the

field, yet nowhere in the specifications of his patent does he give any directions for constructing one-half as a lifter, and the other as a forcer. He does not state the proportions of the two pipes, and how one shall be constructed in order to operate as a lifter, and how the other shall be constructed to operate as a forcer. It may be true, and it probably is, that the art of constructing this class of instruments was so well known at this time that it was sufficient to say to a person skilled in their construction that one side should be constructed to force, and the other only to lift, and the skill and experience of the workmen would supply what was left out of the specifications as to the proportions of the two instruments. This view, and this alone, saves the patent, so far as this third claim is concerned, from being absolutely void for uncertainty, because he does not instruct the public how to make lifters, nor how to make forciers; and if the rules for constructing these different instruments were not then well known, then the instruments cannot be made and combined. In other words, he seems to have assumed that the difference between a lifter and forcer was part of the common knowledge of those skilled in the art of making injectors.

Much of the contention between the experts in the case centers around the question whether an instrument constructed according to the second form shown in the French and English patents will work as a practical combined lifter and forcer, and feed or supply a boiler with water under varied pressure. Witnesses in behalf of complainant testify to experiments made by them with such an instrument with which they wholly failed to do the work; while witnesses for defendant testify to the successful use of injectors made in strict conformity with the drawings of these foreign patents. Of course, if the Giffard device, or a machine made according to his drawing, will not work, or was not a practical and useful machine, operating

substantially upon the principle shown in the Hancock, then the Giffard device should not be deemed an anticipation of Hancock's: but I am satisfied from a careful study of the proof that an injector made after the plans of Giffard's Fig. 2 is and will be a practical working injector, lifting the water, and forcing it as successfully as an instrument constructed under the direction of the Hancock patent, and hence I conclude that the Giffard patents show a practical and successful mode of combining a lifter and forcer which produces the same result as the Hancock, and differs from it only in the juxtaposition or location of the operative parts.

The defendant sells an injector manufactured by James Jenks, of Detroit, in which he also has arranged the forcer and the lifter side 93 by side, instead of placing them in an axial line to each other. Forcers being old and lifters being old in the art, and the Giffard patents, and several of the other earlier patented improvements upon Giffard's device, having expired, any person had the right to take the injector and the lifter, as shown in Giffard's device, and arrange them, either as he arranged them, the one following the other, or side by side, the way Hancock has arranged them. No such special advantage is shown to have accrued by the arrangement of the two devices side by side as to make that arrangement of itself patentable. The instruments still operate by the same law, and in the same manner, when the two are along-side of each other as they did when the forcer was ahead of and in the line of the lifter. I therefore conclude that, so far as the Hancock patent is concerned, he had no right, at the time he took his patent, to cover broadly the combination, which he does by the third claim of his patent, of an injector for forcing water into a boiler and a second injector communicating with the well, and communicating with and supplying water to the first, because Giffard and

Barclay and Morton had instructed the public how to do this long before the date of his invention, by the use of substantially the same operative parts.

The bill is therefore dismissed for want of equity.

¹ Reported by Charles C. Linthicum, Esq., of the Chicago bar.

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