was also asked as incidental to the principal relief against the collection of a particular tax levied to meet the interest on the bonds. The leading question here was whether the case had been properly removed from the state court, and no consideration was given to the case upon the merits. As to the jurisdiction of this court, we said: "The main question at issue was the validity of the bonds, and that involved the levy and collection of taxes for a series of years to pay interest thereon, and finally the principal thereof, and not the mere restraining of the tax for a single year. The grievance complained of was common to all the plaintiffs and to all whom they professed to represent. The relief sought could not be legally injurious to any of the taxpayers of the county, as such, and the interest of those who did not join in or authorize the suit was indentical with the interest of the plaintiffs. The rule applicable to plaintiffs, each claiming under a separate and distinct right, in respect to a separate and distinct liability and that contested by the adverse party, is not applicable here. For although as to the tax for the particular year, the injunction sought might restrain only the amount levied against each, that order was but preliminary, and was not the main purpose of the bill, but only incidental. The amount in dispute, in view of the main controversy, far exceeded the limit upon our jurisdiction, and disposes of the objection of appellees in that regard."

Decree affirmed.

LEHIGH VALLEY RAILROAD COMPANY *v.* KEARNEY.

APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE DISTRICT OF NEW JERSEY.

No. 314. Argued April 26, 29, 1895. — Decided May 27, 1895.

Reissued letters patent No. 5184, granted to Francis Kearney and Luke F. Tronson December 10, 1872, for an improvement in spark-arresters, are void for want of patentable novelty.

Counsel for Appellees.

THIS was a suit in equity brought in the Circuit Court of the United States for the District of New Jersey by Francis Kearney and Mary F. Tronson, executrix of Luke F. Tronson, deceased, against the Lehigh Valley Railroad Company, for the alleged infringement of reissued letters patent of the United States No. 5184, granted to Francis Kearney and Luke F. Tronson, December 10, 1872, for an improvement in spark-arresters, the original patent having been granted April 20, 1871, No. 113,528. Mary F. Tronson having died since the appeal was taken, Elwood C. Harris was substituted as administrator, etc.

The railroad company relied on these defences: 1. That the reissue was illegal and void because the original patent was not inoperative by reason of a defective or insufficient specification, or any error arising from inadvertence, accident, or mistake; that the scope of the patent had been enlarged so as to cover another and different invention from the original, and that new matter had been introduced into the specification; 2. That the alleged invention covered by the reissue patent was not patentable since the change from prior forms of spark-arresters was not productive of any improved or materially different result; 3. That the reissue patent was void for want of substantial novelty in the subject-matter thereof in view of the prior state of the art as shown in certain enumerated patents; 4. Non-infringement.

The case was heard on bill, answer, and proofs, and resulted in a decree for injunction, and referring the case to a master to take an account of the gains and profits accruing to the company by reason of infringement and of the damages suffered by complainants thereby. The master subsequently reported, and a final decree was rendered against the defendant for the sum of $6235.52, whereupon the case was brought to this court on appeal. The opinion of the Circuit Court will be found reported, 32 Fed. Rep. 320.

Mr. Robert J. Fisher and *Mr. Charles E. Mitchell* for appellant.

Mr. Elwood C. Harris for appellees.

Opinion of the Court.

MR. CHIEF JUSTICE FULLER, after stating the case as above, delivered the opinion of the court.

Kearney and Tronson applied January 5, 1871, for letters patent for a certain "improvement in spark-arresters for locomotives," which application was rejected on reference to patent to James L. Vauclain, August 20, 1861, and after various amendments was allowed, and the patent issued April 11, 1871. The following is the specification of the application and of the patent as allowed, the parts stricken out by amendment being in brackets and the parts inserted being in italics:

"The improvement relates to effectually preventing hot coals passing from the chimneys of locomotives, [by a peculiar manner of] arresting them before they get to the chimney.

"On the forward end of a locomotive boiler is an extension, on the top of which is the chimney or smoke-stack. This receptacle of all that passes [from the fire] through the boiler flues to the smoke-stack is technically known as the smoke-head; the pipes from the boiler to the engine pass through the smoke-head, and the steam is exhausted thereinto from the cylinders. In the unoccupied space in this smoke-head we place a grate, [formed either with bars or of netting, or perforated plates; the shape is not material; we make them circular, as being most convenient in ordinary cases. It is best there should be a clear space on all sides or around the grate] *the peculiar features of which are its perpendicular bars with fixed apertures sufficiently fine to stop the sparks that come from the fire, the size of the grate being determined by the area of opening needed for the regular draft and escape of smoke on kindling the fire, or when the engine is not in motion.*

"Upon the top of the grating a tube or pipe is fitted, extending upward a short distance above the top of the smoke-head into the chimney. A space is left around the top of the pipe between the edges of the aperture in the top of the smoke-head and the pipe. This space is covered with netting or grating to prevent sparks or coals from passing through into the chimney.

"In the accompanying drawings, Figure 1 is a view, in sec-

tion, of the front of the smoke-head, with the gratings and pipe in position. Figure 2 is a side view of the end of the boiler and of the smoke-head. A is the boiler. B, the flues. C, the smoke-head. D, the grate. E, the pipe on the top of the grate. F is the netting closing the aperture between the pipe and the smoke-head. G is the chimney or smoke-stack; and I, the exhaust pipes from the engines.

"It will be seen that nothing but smoke and gas can pass the top netting F, and that no coals or dangerous sparks can pass into the chimney, they being arrested by the grate D without having received any impulse from the exhaust pipes. The strong draft created by the exhausting steam up the pipe into the chimney brings the coals and sparks to the grating, against which they strike and fall harmless into the space in the smoke-head. [The force of coals drawn from the fire when impelled by the exhaust steam up the chimney is such as to cut through netting, and even cast iron over a quarter of an inch thick, in two or three months, in any description of spark-arresters located in the smoke-stack.]

"By our arrangement the gases that are returned by contrivances that turn sparks downward in the smoke-stack, and sometimes force open the fire-door, have a clear passage to the atmosphere.

"[What we claim and desire to secure is —

"1. The grate D, pipe E, the net or grate F, as and for the purpose specified and shown.

"2. Combining a spark-arrester with the smoke-head of a locomotive in the manner and for the purpose hereinabove set forth.]

"*We disclaim all draft-regulating contrivances, and also all gratings with lateral adjustable openings. What we do claim as our improvement, and desire to secure, is — The grate D with longitudinal bars, as and for the purposes specified and shown.*"

On June 7, 1872, Kearney and Tronson applied for a reissue, which was rejected on reference to James L. Vauclain, smoke-stack, August 20, 1861; Weideman, Major and Sample, spark-arrester, December 20, 1870; and James Smith, spark-arrester,

March 7, 1871; and after amendment was allowed, and the reissue granted December 10, 1872.

The following is the specification of the application and of the reissue as allowed, the parts stricken out being bracketed and the parts inserted italicized:

"Figure 1 is a vertical cross-section of the smoke-box of a locomotive with our improvements attached, and

"Figure 2 is a vertical longitudinal section of the same, and a portion of the boiler.

"The letters of reference indicate the same parts in both figures.

"A represents a portion of the boiler of a locomotive. B is a space, commonly called the smoke-box. CC are the flues at the point where they enter the smoke-box; E is a pipe extending from within the base of the smoke-stack down into the smoke-box, and commonly termed a 'petticoat pipe;' D is a grating placed at the lower part of the petticoat pipe to prevent any cinders or sparks passing into the same; F is a netting or grating placed around the top of the petticoat pipe so as to cover the annular opening caused by the difference in size of the upper part of the petticoat pipe and the bottom of the smoke-stack G. H is a piece of boiler plate or sheet iron placed at the bottom of the smoke-box in order to provide a flat surface for the grate D to rest upon, and is provided with holes, through which the exhaust pipes II pass.

"Our improvements relate to providing locomotives with a suitable device for preventing live coals, cinders, sparks, and like substances, which may leave the furnace, from passing into or out of the smoke-stack, and to retain them in the smoke-box, from which place they may be removed at pleasure.

"It has heretofore been the practice to cover the tops of smoke-stacks of locomotives with a wire netting or grating, for the purpose of preventing the escape of sparks and cinders; and, in some cases, an inverted metal cone is also placed in the centre of such netting or grating to receive and break the force of the cinders as they are thrown against it.

"In all of these contrivances the cinders receive so much force from the exhausting steam while on their way up the

petticoat pipe and smoke-stack that they very soon destroy the netting or grating placed at the top of the smoke-stack, and where a cone or other device is used to turn the cinders downwards and partially protect the grating the gases are also retarded in their escape.

"In order to overcome these difficulties, we place a grating, D, at or near the lower end of the petticoat pipe E so as to surround the exhaust pipes II, and prevent any cinders or sparks entering the pipe E, while allowing free passage for the smoke and gases. We also place a grating or netting, F, around the top of the petticoat pipe to cover the aperture left between it and the smoke-stack in order to arrest any sparks or cinders that may be drawn to that point.

"[In the construction of the grating E we prefer to use vertical bars as shown in the drawing, but any style or kind of grating may be used that will prevent cinders or sparks from entering the petticoat pipe, such as a perforated surface or a grating formed in any manner desired, and the apertures or perforations may be regulated in size and area of surface covered by the amount of opening required for the regular draught and escape of smoke on kindling the fire or when the engine is not in motion.]" *We construct the grating D with straight vertical bars of iron, placed at small distances apart, but these spaces should be such, in the aggregate, as will be sufficient for the draught and escape of the smoke, on kindling the fire, or when the engine is not in motion.*

"By this arrangement nothing but smoke and gas are allowed to pass the netting F, and no coals or dangerous sparks can pass out of the smoke-box into the petticoat pipe, they being arrested by the grating D before having received any very great impulse by reason of the exhaust pipes. The strong draught up the pipe E and smoke-stack brings the greatest portion of the cinders and sparks to the grating D, against which they strike and fall harmless to the bottom of the smoke-box, while the smoke and gases have free and uninterrupted egress through the petticoat pipe and smoke-stack, they being perfectly clear; and the gratings D and F are not liable to be injured by the cinders striking

against them, as they are arrested before having obtained the force they would have if allowed to pass up into the smoke-stack.

"What we claim as our invention, and desire to secure by letters patent, is —

"[First. Placing a grating in the smoke-box of a locomotive to prevent sparks or cinders entering the petticoat pipe, substantially as described and shown.

"[Second. The combination of the grating D with the netting F, substantially as and for the purposes described and shown.]

"*First. The grating D, with vertical bars placed at the foot of the spark or petticoat pipe E, in the manner and for the purpose substantially as described.*

"*Second. The combination of the grating D with the netting F, in the manner and for the purpose substantially as described.*"

The drawings accompanying the reissue were, with some difference of lettering, practically the same as accompanied the original application, and were as follows:

Fig. 1.

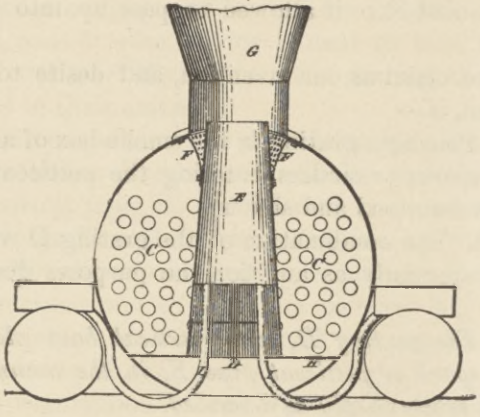
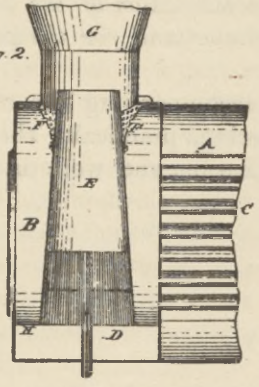


Fig. 2.



As to the original specification, it will be perceived that the application was for a patent spark-arrester placed in the smoke-box of a locomotive in contradistinction to a spark-arrester placed in the smoke-stack, and it was said that the spark-arrester might be "formed either with bars or of netting, or perforated plates; the shape is not material; we make them circular, as being most convenient in ordinary cases;" but after the application was rejected on reference to the Vauclain patent of August 20, 1861, the specification was changed so as to disclaim the construction of Vauclain, and the claim of a combination of "a spark-arrester with the smoke-head of a

locomotive" was altered to a claim for "the grate D with longitudinal bars," the specification being amended accordingly. The construction of the grate "either with bars or of netting, or perforated plates," was changed into "perpendicular bars with fixed apertures, sufficiently fine to stop the sparks which come from the fire," and the clause that "the force of coals drawn from the fire when impelled by the exhaust steam up the chimney is such as to cut through netting, and even cast iron over a quarter of an inch thick, in two or three months, in any description of spark-arresters located in the smoke-stack," was struck out. The claim, taken with the specification and drawings, covered the combination in the smoke-box of a locomotive engine, of a petticoat pipe with a spark-arresting grating composed of longitudinal bars, and as no other form was described or illustrated and the grating was designated by the reference letter, it followed that it must be of the form shown in the drawings, namely, a series of long bars placed vertically with long openings between them extending from the top to the bottom of the grating.

The rule is that where the applicant acquiesces in the rejection of claims by the Patent Office or in a construction which narrows or restricts them, and where the elements which go to make up the combination of the claim are mentioned specifically and by reference letters, leaving no room for question as to what was intended, the claim must be confined and restricted to the particular device described. *Knapp* v. *Morss*, 150 U. S. 221.

We find nothing in the specification to indicate that the use of the vertical bars was patentably different from the netting or perforated plates originally stated to be equivalent devices, and no new result produced by the use of those bars is pointed out. As to the specification of the reissue application, it will have been seen that what was omitted before because rejected by the Patent Office was restored, and it was again stated that the form of the grating was not material, but that any kind of apertures or perforations might be used, though a preference was expressed for the use of vertical bars as shown in the drawing. There was in the reissue a description of a piece of

boiler plate or sheet iron at the bottom of the smoke-box providing a flat surface for the grate to rest on, and having holes for the passage of the exhaust pipe, and this plate, letter H in the reissued drawings, was not described in the original patent, although in the original drawing there was a faint line running across the smoke-box which might be said to be such plate, as the grate could not stand on nothing. The disclaimer was also omitted. The claims of the reissue patent as filed were: 1st. Placing a grating in the smoke-box of a locomotive to prevent sparks or cinders entering the petticoat pipe, substantially as described and shown; 2d. The combination of the grating D with the netting F, substantially as and for the purposes described and shown. These were substantially the same claims as were made on the original application and afterwards abandoned. The reissue application having been rejected, these claims were struck out and two others substituted, the second of which was substantially the same as the original second reissue claim, and the first of which limited the invention to the specific form of grating shown; and the specification was amended by erasing the matter which provided that the form of grating was immaterial, and inserting the paragraph stating the construction of the grating D, with straight vertical bars of iron, placed at small distances apart.

We are of opinion that the patent was limited to a grating composed of vertical bars and the spaces between them, the bars being attached at their upper ends to the bottom of the petticoat pipe.

Ordinarily the tubes for heating water in locomotive boilers lead from the fire-box into the smoke-stack; and smoke, gases and cinders are discharged into the atmosphere through the smoke-stack, propelled by the draft created by the exhaust steam. To arrest the discharge of sparks and cinders, locomotives were provided years before the date of this patent with various devices known as spark-arresters.

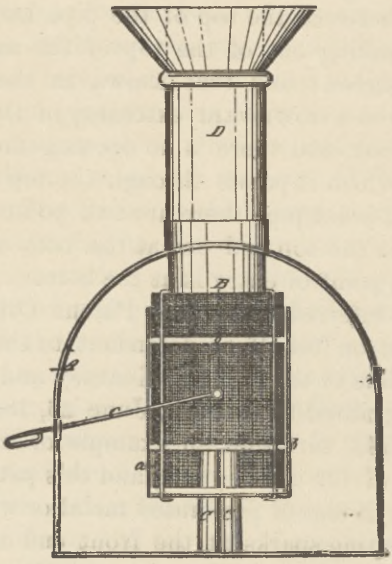
On the hearing, several forms of pipe into which the exhaust steam is discharged through exhaust-nozzles were referred to as long in use; particularly that shown in the Kearney and Tronson patent, technically known as a petticoat pipe, in

which the pipe is greater in diameter at the bottom and an opening is left between the top of the pipe and the opening for the stack leading out of the top of the smoke-box, and guarded by a screen; and that shown in the May patent, where the pipe is a downward extension of the smoke-stack into the smoke-box, and there is no opening around the pipe at the point at which it passes through the top of the smoke-box. In the petticoat pipe there are two points of entry into the stack, one at the top and one at the bottom of the pipe; in the other the point of entry is at the bottom.

The patents referred to by the Patent Office and others were introduced on behalf of defendant to show the state of the art at the time of the grant to Kearney and Tronson.

The patent granted to Hubbell, June 26, 1841, for a spark-arrester, No. 2143, furnishes an example of a spark-arrester below the base of the smoke-stack, and this patent shows that in that year a cylinder of perforated metal or wire gauze could be used for arresting sparks at the front end of a locomotive and within the smoke-box. The patent to May, July 28, 1857, No, 17,884, showed a spark-arrester in a locomotive smoke-box, the two exhaust-nozzles entering a drum made of perforated plates of metal or wire gauze. This drum, at the upper end, is attached to a downward prolongation of the stack into the smoke-box. May's claim was: "My arrangement of the spark-arrester within the smoke-box of the locomotive steam-boiler so that the stack or chimney shall be prolonged down into the smoke-box and made of wire gauze or perforated plates, and otherwise so constructed as specified that the entire track of the smoke shall be through the gauze or perforated plates." He sets forth "the advantages of making the spark-arrester within the smoke-box instead of placing it within the chimney or in a chamber arranged above the smoke-box, and made to communicate therewith by a flue."

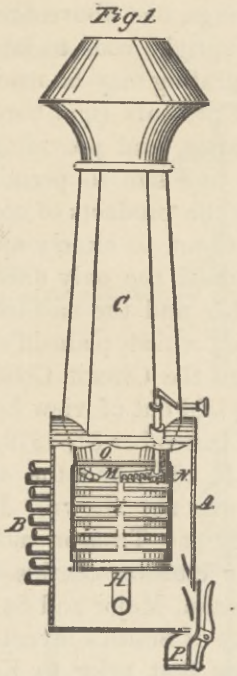
Fig. 1 of May's drawings is as follows:



The patent of Vauclain of August 20, 1861, No. 33,114, has a similar cage or grating to that of May's patent and the same arrangement of downward extension of stack and exhaust nozzles, but there is a screened opening at the top of the cage for the passage of smoke and gases, and the perforations are horizontal. These apertures, as stated in the specification, may consist chiefly or wholly of latitudinal slots, and the drawings show that the perforations are quite elongated.

In the opinion of the Circuit Court it is said that the apertures appear, from the drawing, to be cut out of sheet iron, and that such a screen "could not be said to be made of iron bars, which are the thing patented to the plaintiffs, but it approaches very near to it. The slots and iron strips are also placed horizontally, whilst the plaintiffs' patent is for a grate with vertical bars." But there is no suggestion in the patent that the perforated screen is made of sheet metal. Nothing is said in the specification as to material, and the drawings do not impress us as affording a satisfactory basis for the conclusion that the material was sheet rather than cast iron.

Fig. 1 of this patent is as follows:



In the patent to Sweet, dated June 23, 1863, No. 38,992, the exhaust nozzles enter a hollow cylinder made of wire gauze, and the screens are described as being either in the form of a cylinder or the frustrum of a cone.

In Smith's patent of August 16, 1870, No. 106,515, a device of perforated metal is used. This patent shows the exhaust nozzles as entering the frustrum of a cone formed of perforated metal which at the top unites with a downward extension of the chimney, the perforations extending up to the smoke-arch, and outside of the spark-arrester is a lift pipe which may be made adjustable.

The patent to Weideman, Major and Sample, of December 20, 1870, No. 110,315, shows a spark-arrester of finely-perforated metal, a petticoat pipe, and what is called a draft pipe.

Smith's patent of March 7, 1871, No. 112,506, describes a

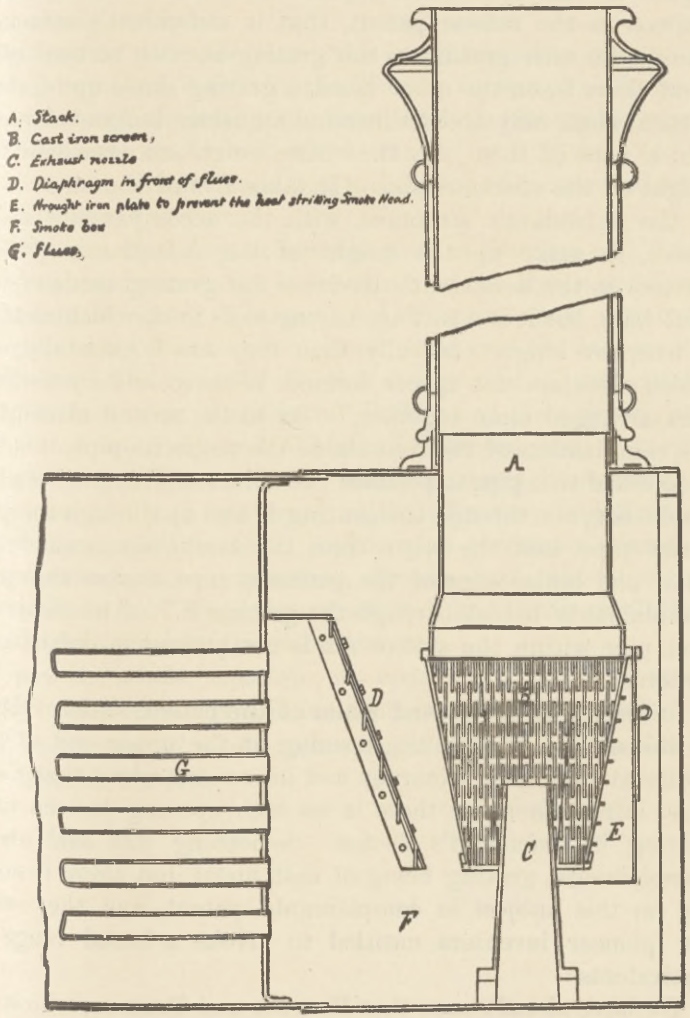
spark-arrester consisting of a grated tubular casing made by a continuous bar of wrought iron coiled spirally in horizontal coils, or of cast-iron rings, one above the other, lying horizontally and strung to upright rods to keep them a proper distance apart, "or, the grating may be made in any other desired manner, providing it presents rigid bars for the hard ignited cinders to strike against, and providing there are openings sufficient in number and size to permit the free escape of lighter particles with the products of combustion." This was held by the Circuit Court to closely approach the invention patented by the plaintiff, the only difference being that the coiled wrought-iron bar and the cast-iron bars or rings were horizontally arranged, whilst plaintiff's patent required the bars to be vertical, but the Circuit Court was of opinion that this patent should be laid out of view because plaintiff's application was sworn to December 31, 1870, and filed in the Patent Office, January 5, 1871, and the time of the filing of Smith's application was not shown. It should, perhaps, be noted that as Kearney and Tronson modified their claims on the reissue upon the citation of this patent with those of Vauclain, and Weideman, Major and Sample, they apparently conceded the seniority of Smith's invention.

These patents show that, prior to Kearney and Tronson's invention, spark-arresters had long been placed at the base of the smoke-stack in connection with a petticoat pipe or a downward extension of the stack; that the advantage of placing a spark-arrester in the smoke-box instead of in the smoke-stack was recognized as early as the May patent, July 28, 1857; that the exhaust nozzles had been led into the base of such arresters, and that such arresters had been made from wire gauze and from perforated metal, the apertures producing in one instance horizontal gratings.

The spark-arrester with vertical slots or perforations, used by defendant, until discontinued upon the commencement of this suit, was devised by its own employés and was used in ignorance of complainants' patent as matter of fact and taken out upon notice of the claim for infringement. This spark-arrester was originally constructed under the patent to Alex-

ander Mitchell, No. 178,181, May 30, 1876, and was provided with round perforations, afterwards changed so that the perforations were elongated.

The device is in substance as follows:



What is claimed is that these apertures are an infringement because they are upright, although conceded that if rectangular they would not infringe.

The defendant's expert testified, correctly as we think, in regard to this device as compared with that described and claimed in the reissue patent, that in defendant's structure there is no such grating as the grating D, with vertical bars, "but there is, on the other hand, a grating made up of short vertical slots, only about three and a quarter inches in length, which none of them run the entire height, or even half the height of the spark-arrester. It takes five of the short slots of the defendant's structure, with the accompanying cross-pieces, to make up the height of the defendant's device. Neither in the defendant's device is the grating made of vertical bars, but it is a casting, having slots in it, which slots, it is true, are longer vertically than they are horizontally, but which slots are not spaces formed between and by vertical bars arranged close together." As to the second element in the combination of the first claim, the petticoat pipe, it is the function of that pipe to produce "two lines of draught from the smoke-box, one through the grating D and up through the petticoat pipe, and the other from the smoke-box around the outer and upper edge of the petticoat pipe, and as shown in complainants' patent through the grating F." And the petticoat pipe within the smoke-box is not present in defendant's structure.

In respect of the second claim of the patent, which relates to the netting F over the opening at the upper end of the petticoat pipe, both Kearney and his expert admit that there is no infringement, as there is no such opening and no such netting in defendant's device. Something was said about complainants' grating being of cast metal, but there is nothing on this subject in complainants' patent, and they were not pioneer inventors entitled to invoke a broad range of equivalents.

We have already seen that Kearney and Tronson, who were experienced and practical railroad men, declared in their original applications for the patent and for the reissue, that the

shape of their grating was not material, and that it might be made either from bars or netting or perforated plates; and if their particular construction of grate with the long vertical bars was a mere equivalent for the grates shown in the prior patents, then it would not be a patentable invention, but a mere change of form.

And we do not understand the specifications to set up any new or improved result by the grating composed of vertical bars, (although the advantage resulting from placing the spark-arrester in the smoke-box, which was old, was shown,) nor do we find from the evidence that the change of form constituted any advance in the art.

It appears that a spark-arrester such as Kearney and Tronson's was used upon a few locomotives on the Morris and Essex Railroad, of which Kearney and Tronson were employés, Tronson being the master mechanic, and that the use was discontinued after a year or so; that it was used experimentally on a locomotive on the Central Railroad of New Jersey, and on one of the Troy and Whitehall Railroad; but a careful consideration of the evidence, which we deem it unnecessary to review in detail, convinces us that Kearney and Tronson originally correctly averred that bars, or perforated plates, or wire nettings, were equivalent devices, and that a grating with vertical bars was not productive of any better result than was accomplished by the prior devices.

Upon the whole, therefore, we conclude that the Kearney and Tronson reissue is void for want of patentable novelty.

Decree reversed and cause remanded with a direction to dismiss the bill.