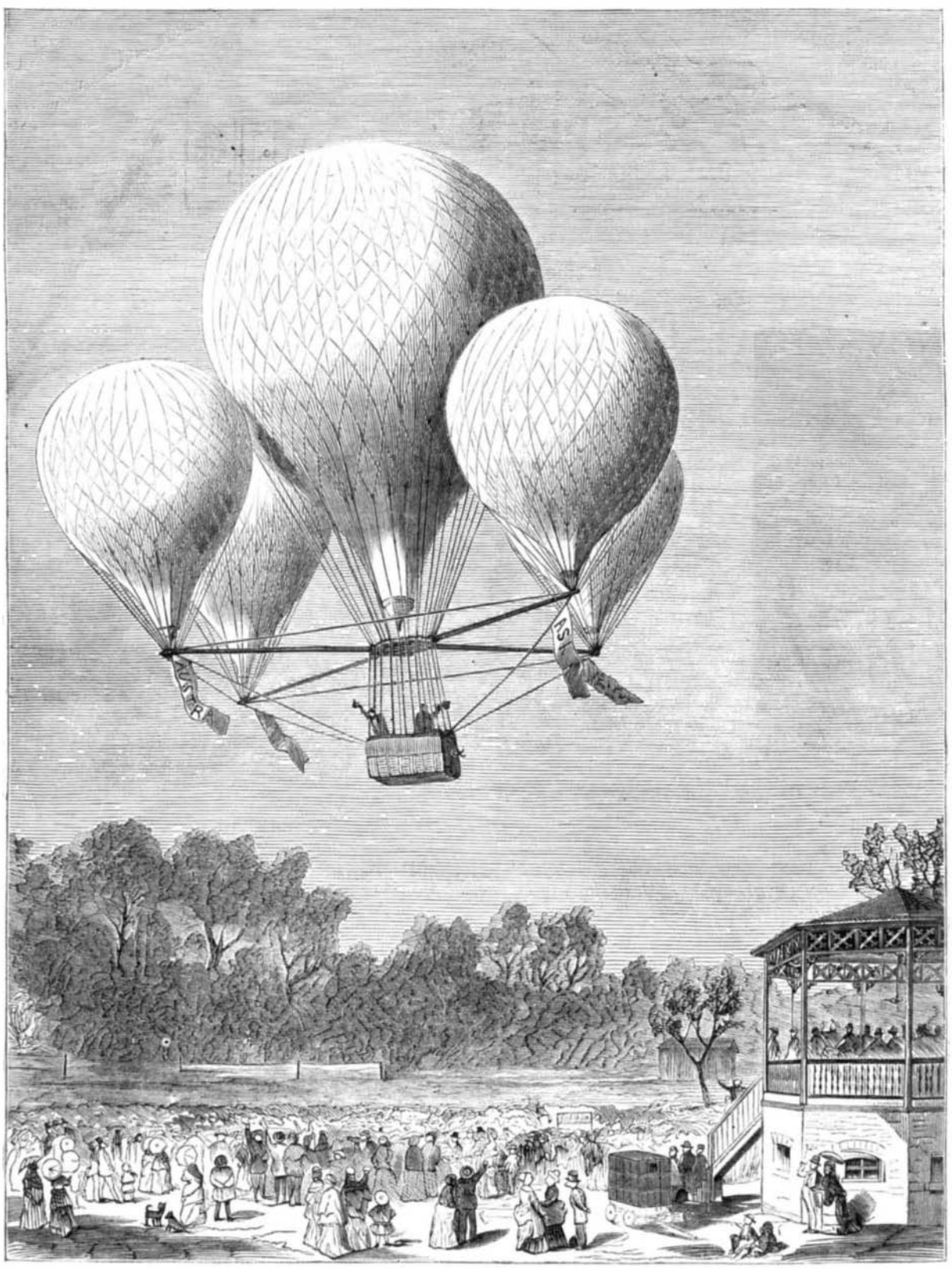
A NOVEL BALLOON ASCENT.

The French nation has long been foremost in aerial navigation. Pilâtre de Rozier became famous as the first who ventured to ascend in a fire balloon, the invention of the renowned Montgolfier. This was on October 15, 1783, a few animals having previously been sent up, which safely returned to earth. Soon after, Pilâtre again went up, taking with him the Marquis d'Arlandes; and gradually it became so fashionable to take a trip into the higher regions that many persons fell victims to the aerial fever. Pilâtre himself lost his life, being precipitated into the Channel in attempting to cross. It is to him that the idea of using balloons for war purposes is to be ascribed, as on his suggestion the Convention authorized the formation of a company of *Aerostiers*, who were employed in reconnoitering the enemy. Two officers made the observations, and communicated with earth by means of flags, or by messages written on paper and weighted to prevent their being lost. The last experiments of this kind were made in Algiers, in 1830, but with so little success that the company was dissolved.

Aerial navigation, however, assumed great prominence again in the late war, especially, as we have often described in these columns, during the siege of Paris. It was in this excellent school for aeronauts that Theodore Sivel, one of whose remarkable ascents forms the subject of our illustration, was educated. He traveled after the close of the war, with his beautiful balloon *Koloss*, in Sweden and Denmark, and then in Germany. His mother-in-law, Madame Poitevin, a well known aeronaut, was probably his instructress. The ease and elegance of Sivel's balloon in ascending created a general sensation.

In Leipsic (in the fall of 1873) he was descending rapidly, with five other voyagers; and seeing a great danger, he boldly discharged the gas at once (by a suitable mechanism for slitting up the balloon), after the anchor had taken hold, and obtained thereby full control over the empty balloon, without any loss or accident. His most remarkable ascent, however, was made on May 20, 1874, from Leipsic, when he ascended with five balloons, fastened together, which was, as he himself stated, "the grandest experiment ever undertaken in this line." This ascent is the subject of our picture. Around the main balloon, *Europa*, were secured the four smaller ones, named Asia, Africa, America, and Australia. The ascent was made at 5:50 P. M., Sivel and one passenger being in the basket. The strong wind carried the balloons, which turned playfully around on their axes, in a westerly direction; and they were visible at an elevation of 9,000 feet, as their great bulk made them very obvious at that hight. At about 7 o'clock Sivel detached the smaller balloons, and succeeded in drawing them down to the basket and hooking them thereto. He then opened their valves simultaneously, and descended, safely and majestically, to the earth near the railroad station at Dürrenberg. A few days after this ascent a double ascent was undertaken, Sivel rising in the before mentioned *Koloss*, and Madame Poitevin traveling in the balloon *Zenith*, making an almost unique display in aeronautics.



SIVEL'S RECENT BALLOON ASCENT AT LEIPSIC, GERMANY.

Making Hand Organs.

On the front of a dingy brick building at the head of Chatham street, weather-beaten and dim, hangs the sign: "Hand Organs." A reporter of the New York *Sun* saw the sign and went in; and thus he describes his interview with the workmen, and what he saw. Standing at benches, leaning over old organ boxes, seated before little stands, five men were at work. In the middle of the room stood several old hand organs. On the walls hung queer patterns, numbered and diagramed; in the further corner stood a machine seven or eight feet high, looking for all the world like a threshing machine.

"Is the proprietor in?" asked the reporter of the workman nearest the door.

The workman turned, pointed toward the other end of the room, and went on cutting out long strips from a great sheet of pasteboard.

Sitting on a low chair, with a low table before him, was a short, stout, jolly-faced man, evidently a German. On the bench in front of him, mounted on two wooden rests, hung a wooden cylinder, fifteen inches long, perhaps, and five inches in diameter. Behind the cylinder was a small case, a Lilliputian type case, containing thirty-six little boxes, and every box full of little brass pins.

"What do you charge for a common sized organ?" asked the reporter.

"It depends on the kind," answered the proprietor; "I can make you a flute organ, with twenty-four keys, to play nine tunes, with a black walnut case, for a hundred dollars. If you want an organ to play ten tunes, I can make it for you for a hundred and twenty dollars. An organ of this size will weigh about twenty-five pounds. A parlor organ, with from 25 to 46 keys, will cost from a hundred and fifty to two hundred and fifty dollars. A side show organ, to play nine tunes, with 60 keys, 35 brass trumpets, large and small drums, and triangles, I can make you for two thousand dollars."

While he was talking, the jolly little man sat pegging away at the cylinder before him, driving a pin here and a peg there, straightening them with a little pair of pinchers, and flattening them with a little, light hammer.

NEW TUNES IN OLD INSTRUMENTS.

"What are you driving those pegs in there for?" asked the reporter.

"This is an old cylinder. It was made years ago," he answered; "the tunes that were all the go then don't draw out the pennies worth a cent now. I am putting new tunes in it. I take the cylinder out and paste a sheet of clean white paper around it. Then I mark it for the tunes, and drive these little pins in, and the thing is none. Its very easy to do."

It looked very easy. The cylinder was covered with hundreds of little black lines, some half an inch long, others scarcely more than a dot. The reporter asked how he knew where to draw the lines.

The little man took a handful of the little pins out of his apron on his lap, took a few dozens more out of his mouth, got on and began to turn the crank of a dismantled organ that stood near.

HAND ORGANS AND CHURCH ORGANS.

"You see," said he, "a hand organ is made like any common organ. It has a bellows and pipes and keys. When you want to play on a church organ, you push down on the keys; when you want to play on a hand organ, you lift the keys. You use your fingers to play on a church organ; these little brass pins are the fingers on a hand organ. You see these little wires that hang down from the ends of the keys? Well, every time one of those wires strikes one of the brass pins when the cylinder is going round, the key is raised and the note is sounded. If the brass pin is one of those long, half inch ones, the key stays up a good while, and the note is a long one. If the pin is just a little dot, the key falls right back, and the note is short."

"But how do you know where to mark the cylinder for the tunes?"

"That's the secret of the trade," answered the little man; "but I guess I'll show you. You see, the cylinder is covered with clean paper, and all ready; now I hang it in by the iron rod that sticks out at each end. The tune I want to mark it for I play on the keys, only I press the keys down instead of lifting them, for I know what noise they would make just as well as if they did make it. Every time one of those little wires strikes the cylinder, it makes a little dent. If I hold it down for a long note, it makes a long mark; for a short note, it makes just a dot. Then I go over the marks with a pen to make them plain. When one tune is marked, I go on with the next. When the tunes are all marked I put the pins in, as you see."

"How do the organ grinders change from one tune to another while they are playing in the street?" inquired the reporter.

"Every organ," responded the little man, "plays from seven to ten tunes. This one I am working at plays eight. Do you see these little grooves?" and he pointed to one end of the cylinder, where a piece of wood had been left, about two inches long and an inch and a half in diameter. There were eight little grooves around the projection. "When the organ grinder wants to change the tune, he lifts that little spring, shoves the cylinder in or out one groove, and the tune is changed."

"How long do the organs generally last?" asked the reporter.

"Oh, bless your soul," said the little man, "five years is no time at all for a hand organ. Why, there's many an organ travelling the streets that's been used every day, week in and week out, for the last thirty years. That's just what kills the business. They last too long."

"How many organs do you make in a year?" asked the reporter.

"Well, from seventy five to a hundred. When times are hard, more men have to go to grinding organs, and the business is better. I shall make a hundred this year."

"That ought to make a profitable business."

"No it don't. Materials are so high that there's not very much profit on organs. I have to do some work in other branches to make it pay. I make a great many automatic figures for travelling shows, and repair 'most all kinds of musical instruments."

"Then there are a hundred new organs turned loose to prey on the public every year."

"More than that," said the little man. "This is the only hand organ manufactory in the country, but there is a firm that imports them from France. They sell about as many every year as I do, and sell them for the same prices."

"Then there is no competition?"

"No, no competition."

"Can any of your workmen mark the cylinders for new tunes?"

"No; there are only two men on this side of the Atlantic who

can put the tunes on a cylinder—the man who imports organs from France, and myself."

"Are there many Germans grinding organs?"

"No," responded the organ maker, "the grinders are nearly all Italians and old American soldiers."

Four Messages at once with One Wire---A New Telegraphic Improvement.

A new invention in telegraphy by George B. Prescott and Thomas A. Edison has lately been successfully tested at the main office of the Western Union Company in this city. The new invention is a process of multiple transmission by which two messages can be sent simultaneously in the same direction over the same wire, and either message can be dropped at any way station on the circuit. The old duplex system can be applied to the new invention, and by the combination four messages can be sent simultaneously over the same wire in opposite directions between any two terminal points. The old Morse key is used, with no duplication except as to parts of machinery. It is alleged that the invention will quadruple the usefulness of the 175,000 miles of wire now owned by the company.

Mr. Prescott is well known as the electrician of the Western Union Company. Mr. Edison has probably made more inventions pertaining to practical telegraphy than any one man now living. We hope that these expectations will be fully realized. The advances thus far made in the practical uses of electricity are many and various. But it may be truly affirmed that we have at present only reached the threshold of this great department of human industry. Except chemistry, we know no field more promising for the inventor and discoverer than that of practical electricity. Young men should study the subject.

The Bessemer Saloon Steamer.

This vessel, intended to obviate sea sickness in the passage across the Channel, is rapidly approaching completion. The vessel has been completely plated, and the fitting of her engines and boilers in place will soon be accomplished. This work will be done while the ship is on the stocks, so that, when she is launched, she may, by the same tide, be sent upon her trial trip. The vessel, so novel in her construction, is an object of great interest, and scarcely a day passes without several visitors from a distance inspecting her. The ship is 350 feet long at the water line, and for 48 feet at each end the deck is only about 4 feet above the line of flotation, so that in rough weather the sea will wash over these low ends. The decks on this portion of the vessel have a considerable curve, and the sides of the ship are rounded off so that the water may escape as speedily as possible. This form of end has been selected with a view to obviate any tendency to pitching. Above these low decks a breastwork is erected about 8 feet high. The whole of this breastwork deck is to be devoted for the use of the passengers, and that portion fore and aft of the paddle boxes will be protected with stanchions. The vessel will be propelled by four paddle wheels, and 90 feet of the space between the paddles will be occupied by the swinging saloon. Beyond this and at each end the space is occupied, nearest the saloon by the engines and next by the boilers. At one end of the breastwork there will be accommodation for the crew of the ship, and beneath their quarters stowage room for passengers' luggage, etc. At the opposite end of the breastwork the space is fitted with cabins for the special use of ladies, and below these cabins there is a saloon 52 feet long, and fitted with sofa seats all round. Along the sides of the breastwork deck, between the paddle boxes, there are other cabins for passengers, besides smoke rooms and refreshment rooms. The Bessemer swinging saloon is making good progress, and already a good idea of the principle may be obtained by an inspection of the work. The saloon proper is about 70 feet long, 26 feet wide, and very lofty. The weight of the saloon is borne by four large bearings, one at each end and two near the center. The end bearings are fixed on iron transverse bulkheads, which are well stiffened by four and aft ways to prevent them buckling. The saloon will be one of the most superbly fitted apartments afloat. The top of it will form a promenade deck, and it will be fitted all round with seats. The saloon will be entirely under control of the machinery invented by Mr. Bessemer, and it is declared that it will be kept perfectly free from rolling during the passage across the Channel, and passengers, it is expected, will not feel any more unpleasant sensation than they would in going up or down the Thames. The ship will be supplied with two very large life rafts on the plan patented by Mr. Christie, and she will be steered and her capstans, etc., worked by hydraulic machinery. She was designed by Mr. E. J. Reed, C. B., M. P., and Earle's Shipbuilding and Engineering Company at Hull are both the builders and the engineers.

A NEW THAMES TUNNEL AT LONDON.—This is intended to provide a road and railway communication from East Greenwich, across the marshes, to Blackwall Point, then straight across the river by a tunnel to Poplar, thus forming a direct communication from the East India Dock Road on the north side of the river to the Woolwich and Greenwich Road on the south side. The general gradient would be one in forty, and the length of the tunnel 600 yards. The estimated cost is $2,500,000. The distance is greater by 200 feet than the width of the East river between the towers of the New York and Brooklyn Suspension Bridge.

THE NEW STEAMER BRITANNIC—A NEW PROPELLER IMPROVEMENT.

The Britannic, a new steamer belonging to the White Star Line, recently arrived in this port, and has attracted no small degree of public attention on account of numerous modifications and improvements entering into her construction and fittings. The vessel is of exceptionally fine build, 472 feet long, 45 feet beam, and a total carrying capacity of 5,000 tuns. She has compound engines of 760 nominal, but working to nearly 6,000 actual, horse power, and eight boilers, and developed great speed, making the passage over in 7 days, 19 hours, and 35 minutes, which is within half an hour of the fastest time recorded. The interior fittings of the ship are remarkable for elegance and completeness, no improvement adding to the personal comfort of passengers being omitted. There is a blowing engine to force fresh air through the cabins, swinging berths for the sea sick, and running water and basins in every state room.

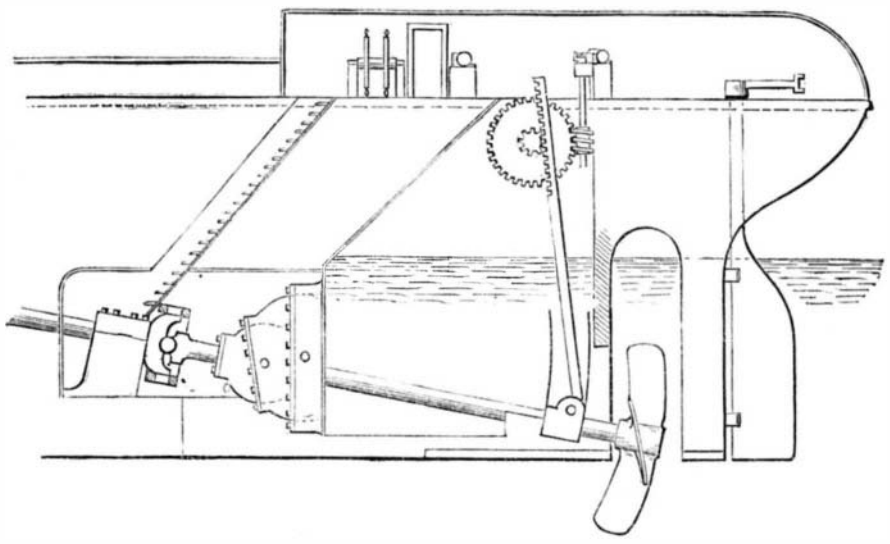
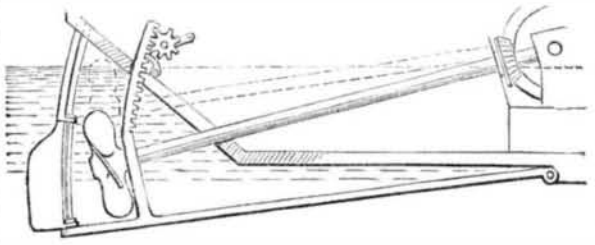


Fig. 1.—PROPELLER OF THE STEAMSHIP BRITANNIC.

To the engineering world, the novel arrangement of the propeller is of especial interest. The object sought is to obtain the maximum benefit from the wheel, and to avoid the loss of power due to its racing when lifted wholly or partially out of water by the pitching of the vessel. From our hasty sketch from the mechanism itself, Fig. 1, this device will be readily understood. The propeller shaft is jointed at

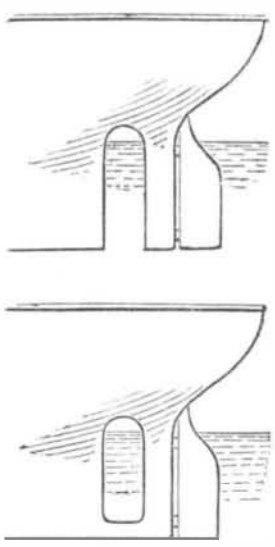
Fig. 2.



a suitable distance from the screw by a universal joint, so that the rear portion of the shaft may be raised or lowered as desired, and still always be in a position to receive motion. We may state here that the invention is somewhat similar in principle to that patented here August 3, 1872, by James M. Dodge, of Newark, N. J., of which we present a diagram, Fig. 2. How far the claims of the British and the American inventors will interfere, or which has priority of date, is uncertain.

The Britannic's apparatus has a very ingenious arrangement, shown near the universal joint, in Fig. 1, for the exclusion of water at whatever angle the shaft may be. A disk, through which passes the shaft, is pivoted within a second disk, and the latter is, in turn, pivoted within a casing forming part of the shaft well, the joints being provided with suitable packing. When the screw is raised by means of the simple gearing shown attached, the first disk is elevated bodily, carrying its point upward, and there rotating the second disk within its casing, and around the first disk, the universal joint being, of course, the center of motion.

Fig. 3.



Not only can the screw be thus lowered at sea, but it may be raised in passing over shoals, or in port, or when a blade is broken, for repairs. The difference in the stern of the vessel, necessitated by this device, is shown in Fig. 3, in which the upper diagram exhibits the construction of the Britannic, while the lower diagram shows the ordinary aperture made for the propeller. It will be noticed that, in the new invention, the strip between the keel and rudder post is necessarily cut away, though replaced, when the screw is sufficiently elevated, by a kind of bolt which slips across. As to how the rudder post, thus left entirely unsupported below, will stand the strain of the rudder and the shock of cross seas is a question which further actual experiment must decide. At first glance, we are inclined to think that this portion must eventually prove an element of weakness.

The Britannic is constructed with the eight watertight bulkheads so arranged that the water entering any compartmen will close the door and isolate it from the rest. There is also ingenious steam steering gear and a telegraphic apparatus for the transmission of signals to the helm.

New Method of Detecting Mercury.

Mayençon and Bergeret give a method consisting in placing an iron nail, to which a platinum wire is attached, in the urine, etc., acidulated with so much sulphuric acid as to cause a slow evolution of hydrogen. The mercury is deposited in the metallic form upon the platinum, which is taken out after the lapse of half an hour, washed, and exposed to a current of chlorine, to convert the mercury into corrosive sublimate. The wire is then gently drawn over blotting paper slightly moistened with a 1 per cent solution of potassium iodide. If mercury is present, red streaks of mercuric iodide, soluble in potassium iodide, are formed. The method is very delicate and rapid. The authors could always detect mercury in the urine (but not in the saliva, notwithstanding that salivation had taken place) after the internal administration of corrosive sublimate, or inunction with mercurial ointment. They also found mercury in abundance in the milk of a woman 48 hours after inunction.

DECISIONS OF THE COURTS.

United States Circuit Court.---District of Massachusetts.

PATENT SAFETY VALVE.—EDWARD H. ASHCROFT *vs.* THE BOSTON AND LOWELL RAILROAD COMPANY.

[In equity.—Before Shepley, Judge.—Decided May 8, 1874.]

Shepley, Judge:

The bill in this case charges the defendants with infringement of letters patent of the United States, reissued November 9, 1869, to the complainant, as assignee of William Naylor, of the county of Middlesex, England, for an improvement in steam safety valves.

The invention relates to spring safety valves for use on locomotive, stationary, and marine engine boilers. As the spring on common safety valves was compressed by the lifting of the valve, the force of the spring became stronger by tension, while inversely, from other causes, the tendency of the valve to rise became weaker. The spring safety valve, therefore, failed to relieve the boiler, for, as the spring was compressed by the lifting of the valve, its power to resist was largely increased; and if steam was rapidly generated, the pressure in the boiler continued to increase while steam was escaping at the valve.

Various attempts have been made, as shown by the various patents in evidence, to obviate this defect in the operation of the common spring safety valve.

William Naylor, in his specification filed in the Great Seal Patent Office of Great Britain, on the 21st day of January, 1854, described two methods of obviating this difficulty; one of these methods claimed by him as his invention, he says, "consists, when using a spring for resisting the valve from opening, in the employment of a lever of the first order, one end resting by a suitable pin upon the safety valve, and the other end of the lever resting upon the spring, being bent downward to an angle of about forty-five degrees from the fulcrum, so that when the valve is raised by the steam the other end of the lever depressed upon the spring downward, and at the same time is moved inward toward the fulcrum, thus virtually shortening that end of the lever, and thereby counteracting the additional load upon the valve as it is raised from its seat by the greater amount of compression put upon the spring." This method he claimed as his invention in the specifications of his English patent. These specifications also described another method of obviating the difficulty. This consisted of the following contrivance: A lateral branch or escape passage was provided for a portion of the steam after it passed the valve, the valve was made to project over the edges of the exit passage for the steam, and the projecting edges of the valve were curved slightly downward, so that the steam, on issuing between the valve and its seat, would impinge against the curved projecting portion of the valve, and a portion of it would be directed downward into the annular chamber which surrounded the central passage for the steam, which chamber communicated with the exit pipe, while the other portion of the steam ascended past the edges of the valve. "By this means," he states, "I am enabled to avail myself of the recoil action of the steam against the valve, for the purpose of facilitating the further lifting of such valve when once opened; *but I wish it to be understood that I lay no claim to such recoil action, nor to the extension of the valve laterally beyond its seat.*" And in the claims, at the close of his specifications, he made no claim for any such extension of the valve, or any device for effecting any recoil action of the steam. In fact Charles Beyer, in his English patent, dated October 21st, 1863, before the date of Naylor's patent, had fully described "a valve made to project over the edges of the exit passage for the steam, and the projecting edges of the valve were curved slightly downward, so that the steam, on issuing between the valve and its seat, would impinge against the curved projecting portion of the valve."

Without adverting to the patents of Henry Waterman and other devices older than Naylor's, we have seen that Naylor could not, with propriety, claim to have been the inventor of the combination, in a spring safety valve, of every form of projecting, overhanging, downwardly curved lip or periphery with an annular recess surrounding the valve seat into which a portion of the steam is directed as it issues between the valve and its seat.

Neither of the attempts to overcome the objections to the spring safety valve in common use appears to have been so far successful as to have introduced either of the inventions into common or general use.

Letters patent of the United States issued September 25th, 1866, to George W. Richardson, of Troy, N. Y., for an improvement in safety valves. The purpose of a safety valve being to open and relieve the boiler, and then to close again at a pressure as near as possible to that at which the valve opened, Richardson accomplished it so far as to invent a valve which would open at the given pressure to which the valve was adjusted and relieve the boiler, and then close again when the pressure in the generator was one hundred pounds to the inch. This practically answered to the required conditions for a useful spring safety valve. It went very soon into general use. The complainant, who is a manufacturer in this country of safety valves, then, as appears from the evidence in the record, endeavored to find something to anticipate the invention of Richardson. Finding in the Patent Office a model of the Naylor valve, with an overhanging lip and an annular chamber surrounding the valve seat, he goes to England and purchases the right to the Naylor invention, and although Naylor himself had disclaimed the recoil action of the steam consequent on the passage of a portion of the steam downward into the annular chamber surrounding the central chamber, while the other portion of the steam ascends past the edges of the valve, and had also disclaimed the extension of the valve laterally beyond its seat, the complainant caused the patent to be reissued to him, as assignee of Naylor, with the following claims which were not in the original patent:

2. The safety valve C, with its overhanging, downward curved lip or periphery and annular recess D, substantially as herein shown and described and for the purpose set forth.

3. The annular recess D, surrounding the valve seat, substantially as herein set forth.

4. The combination of the valve C, and the annular recess D, as herein set forth and for the purpose described.

From a history of the art as previously given, and from a comparison of the original with the reissued Naylor patent, as well as from the language of the claims in the reissued patent, it is manifest that if these claims can be sustained, it can only be for the combination of the described valve with its overhanging, downward-curved lip, with precisely such an annular recess surrounding the central chamber as he describes. Naylor did not invent the overhanging, downward-curved lip or periphery, nor was he the first to use an annular chamber surrounding the valve seat into which a portion of the steam is deflected as it issues between the valve and its seat. His claims must therefore be limited to the combination of the other elements, with precisely such an annular recess as he has described, and operating in the described manner, so far as such recess, separately or in combination, differed in construction and operation (if it did materially differ in those respects) from those which had preceded it. The claims cannot be made to cover a safety valve like the Richardson valve, which, in its construction and mode of operation, is substantially different from the valve described in the Naylor patent. The Richardson valve is the one used by the defendants.

There is a substantial difference between the Richardson valve and the valve in the specifications and drawings of the Naylor patent, not merely in degree, but its increased practical utility results from a substantial difference in construction and mode of operation.

Bill dismissed.

[*James R. Bobb*, for complainant; *J. G. Abbott* and *Benjamin Dean*, for respondents.]