Scientific American.

ESTABLISHED 1845.

MUNN & CO., Editors and Proprietors.

PUBLISHED WEEKLY AT
NO. 37 PARK ROW, NEW YORK.

O. D. MUNN. A. E. BEACH.

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VOL. XL., No. 12. [NEW SERIES.] *Thirty-fourth Year.*

NEW YORK, SATURDAY, MARCH 22, 1879.

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(Illustrated articles are marked with an asterisk.)

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THE SCIENTIFIC AMERICAN SUPPLEMENT

No. 168,

For the Week ending March 22, 1879.

Price 10 cents. For sale by all newsdealers.

THE PATENT BILL DEFEATED.

The bill which threatened so much injury to the patent system (Senate Bill 300) was brought before the House, March 1, and failed to pass.

The industrial interests of the country have happily escaped an imminent peril; for a measure which involved so serious an invasion of the rights of a valuable species of property, to the discouragement of the class of men upon whose efforts our varied industries are chiefly founded, must have reacted disastrously upon the prosperity of all classes.

Accordingly the thanks, not only of inventors and manufacturers, but of the entire community, are due to the members of Congress who voted against the obnoxious measure, and still more to the thoughtful citizens throughout the land, whose multitudinous protests against the passage of the bill convinced Congress that the people were emphatically opposed to the threatened invasion of the rights of inventors.

The advocates of the measure attribute its failure in Congress very largely to the storm of communications which poured in upon the members during the last days of the session; an admission which inventors, and all who hold that the law should favor the patentee rather than the infringer, will do well to bear in mind. The same honorable and effective weapon of defense against the sophistries of powerful corporations—who are determined to mould the patent system in their own interest and against the just rights of inventors and small manufacturers—will assuredly be needed again.

The victory is but a temporary one. Those who are conspiring against the integrity of the patent system are as persistent as they are powerful and unscrupulous. Their agents in Washington and elsewhere are very adroit in covering their aims. While volubly asserting that their sole purpose is the removal of certain evils attending the administration of the patent law, whereby a few innocent farmers and others are made to suffer the consequences of their own indiscretion, the real object is to secure the virtual reversal of the fundamental spirit of the patent system, so as to give to a few combinations of wealthy railway and manufacturing corporations the practical control, on their own terms, of every invention which they may care to use.

There is good reason to believe that a new scheme, involving all the obnoxious features of the bill just defeated, will be pressed upon the incoming Congress; and unless prompt action is taken by the inventors and individual manufacturers of the country to make sure that their representatives in Congress are not left in ignorance of the practical merits of the questions at issue, there is danger that a skillfully worded bill may be pushed on to passage before the members discover its hidden purpose.

There is throughout the country a widespread and earnest feeling among inventors in favor of the formation of an Inventors' Guild, for the encouragement and defense of patentees. Concerted attack, it is said, should be met by concerted defense; and the inventors of the land are numerous enough to be exceedingly powerful, if they will only act together.

Possibly such an organization, properly sustained and officered, might be useful; but we are inclined to think that it is as individual citizens, insisting on their constitutional rights, that inventors can make their influence most beneficially felt. It is not possible for a properly instructed Congress to become the cat's-paw of anti-patent combinations. And if the inventors of the land will personally attend to the business of placing plainly and persistently before their representatives the questions of fact, justice, and sound policy involved in the preservation of the patent system substantially as it is, amending it only to give greater encouragement to inventors and fewer opportunities to infringers, the selfish aims of infringers' unions will surely be thwarted. The inventors have on their side justice and the support of all intelligent lovers of fair play. They are sure to win if they do not allow their case to fail through their own inaction. The hopeful experience of the past few weeks gives abundant reason to believe that indifference to their rights and interests is not a failing of inventors as a class.

MODEL TENEMENTS.

The problem of housing two or three hundred people to the acre securely, cheaply, and wholesomely, is one of vital importance in a city situated like New York.

The report of the Committee of Awards in the competition of designs for tenement houses, lately instituted by the *Plumber and Sanitary Engineer*, is chiefly valuable in the emphasis it gives to one point, namely, the impossibility of constructing an acceptable tenement house on one city lot, 25 x 100 feet, inclosed by buildings at the sides and in the rear.

The conditions to be met by the competitors were these: 1. Security against fire. 2. Distribution of light. 3. Ventilation. 4. Drainage and other sanitary appointments. 5. Seclusion of each suite and publicity of access. 6. Convenience of arrangements. 7. Inexpensiveness.

One hundred and ninety separate designs were sent in, representing all the leading cities of the United States, besides Canada, and London, England. Fifty-four were rather for apartment houses, with but one or two families on a floor, and were thrown out. Some provided for six families on a floor. The limit was fixed at four families. One plan gave only sixty-five rooms to thirty families.

While the plans to which prizes were given were considered by the committee to be improvements on the existing tenement, not one of them was without serious objections; the decision of the committee being that it is impossible to secure the requirements of physical and moral health within the narrow limits of one city lot.

The matter should not be allowed to rest here. Not only should the building of tenement houses on a single lot be prohibited, but a new test should be made as to the possibility of erecting light, safe, and wholesome tenement houses on two or more lots. Obviously it is not the circumstance that two or three hundred people are trying to live on each acre of land that makes our crowded city wards so unwholesome, but the fact that they are living badly under unfavorable conditions. The Windsor Hotel will house luxuriously five hundred people on two thirds of an acre, and then have an average of but one person to a room. Built in blocks of sufficient size, properly constructed and properly policed, our tenement houses might safely and securely shelter twice as many people to the acre as are now festering in unwholesomeness. And such houses would pay.

PROGRESS OF THE TELEPHONE.

We publish in another column a description of Professor Righi's telephone, made and tried last year at Bologna, Italy, which will be found especially interesting to electricians. It would appear that Professor Righi was not only one of the earliest to make a practical telephone, but his instrument has from the first given superior results. The sounds of the voice are transmitted with marvelous distinctness, are heard at a distance from the receiving instrument; and, in fact, many persons, even large audiences, at one end of a line may hear addresses, etc., made at the opposite end. This in itself is not new, as the Edison and Bell instruments have been used in the same manner. The Righi instrument has the special advantage that when once adjusted it continues to operate perfectly without readjustment for an indefinite period; this, we believe, cannot as yet be claimed for any of the other telephones.

The peculiarity of the new instrument is in transmitting the wave sounds through a diaphragm which rests upon a conducting substance made of a mixture of silver, reduced to an impalpable powder, and carbon, also very finely pulverized; the above devices being mounted or carried on the end of a slender spring. In principle the Righi telephone is similar to Edison's carbon telephone, and also to Hughes', which was based on Edison's. It would seem from the results obtained by the Righi telephone that it would be practicable for the Western Union Telegraph Company, or other corporation, to open a room is this city where the visitor might go, and by payment of a small fee sit and listen to the debates and proceedings of Congress. A wide and unbroken field for other uses of the telephone evidently awaits cultivation by enterprising and active individuals.

Professor Gray, we notice, has lately received a patent for a combination of a telephone with the ordinary Morse instrument, so that the telegrapher may communicate over the same line both by the Morse signals and also by the voice. By the use of the quadruplex instrument on such a line four messages may be transmitted by signals in the usual manner, while conversation may at the same time be carred on over the same wire, all without any interference of the different signals or systems. Thus there is added to the present telegraph system of the country an additional method of communication that promises to be highly promotive of the public convenience. Not only may we send the usual written signals to our friends, but we may also speak with them over the same wire; and the expert telegrapher, while he writes one set of messages with his hand, may, at the same time, send other sets of messages with his voice.

THE MENACE TO EUROPE.

We have been taught to look upon the return of the plague which devastated Europe repeatedly during the middle ages, and ceased its ravages in Europe only at the beginning of the present century, as a practical impossibility. In one epidemic five hundred years ago, when Europe was much less densely populated than now, it has been estimated that not less than 25,000,000 people perished. It was, indeed, a common thing in former ages for entire communities to be utterly wiped out of existence by this terrible pest. That could not happen now, it is said. Our modern physicians are better able to combat disease than were those of the past. Sanitary science has been developed, and effective quarantines are possible. Besides men are more intelligent now, and better fed, better housed, and more amenable to sanitary regulations. All of which is true; and we sincerely trust that the experience of the coming year will demonstrate the present impossibility of any widespread epidemic of the plague now filling Europe with alarm.

But Europe must not neglect to take account of conditions now prevailing in Western and Central Europe—indeed, all over the Continent—specially favorable to the development of an irresistible scourge, which may diminish the population of Europe by one-half within the next five years.

It must not be forgotten that the facilities for rapid communication characteristic of modern civilization may be a source of deadly peril in case of a disease so malignantly infectious as the plague. Nations are most intimately bound together by commerce, and every letter or bale of goods may be a means of transmitting infection. Victims of the disease may traverse the entire breadth of the Continent between the time of exposure and the full development of the

disease. With every extension of the area of the plague the possibility of staying its advance by quarantine regulations becomes less, and after it passes a certain limit, pestilence, like fire, is uncontrollable. The supply of physicians and medicines at any time is adequate only for ordinary conditions; let the usual bounds of disease be much overpassed and resistance is hopeless. Such a state of things is by no means impossible in Europe to-day.

Consider the situation of affairs in Eastern Europe. Turkey is a chaos, and the military power which keeps a semblance of order there would soon break down with the plague in its camps. The local governments have neither the power nor the intelligence required to successfully combat an epidemic. The spread of the plague is little hindered by climatic conditions. Russia seems to be unable to stay its progress. The Russian people are already upon the brink of desperation and revolt through poverty and military oppression. Let the controlling arm of the government, the army, be paralyzed, as it is liable to be by the plague, and Russia will present scenes of disorder and death appalling to think of. On such food the plague fattens. The government would be blamed for every disaster, and mobs crazed by fear and revenge and hunger and blood would do their fatal work in every city. All who could command means of flight would fly, and carry the infection into adjoining lands in spite of the strictest sanitary regulations. Germany is almost ripe for revolution. Add to existing hard times and financial disorders the business derangements which precautions against contagion must entail, and a general lack of food and remunerative labor would necessarily ensue. Under such conditions, socialistic outbreaks would be inevitable. The experience of Russia would be repeated, and the steady advance of the plague over Western Europe would certainly follow. Once under way, the wave of death would sweep over Europe as surely and as destructively as it did in the fourteenth century.

Do we, therefore, predict a repetition of those terrible times? By no means. We have only shown that they are possible; that Europe presents conditions which, with plague upon its border, must be considered, to say the least, as decidedly menacing to the entire Continent, if not to the entire civilized world. If reports are true, and the plague is steadily approaching the heart of Russia, the promptest, most rigorous, and most thoroughgoing measures to stay its advance are imperatively needed. Indifference and inaction now will entail the most fearful consequences.

HOW THE PATENT BILL DIED.

The final action of the House of Representatives, in relation to the proposed amendment of the Patent Law, is reported in the *Congressional Record* for March 2, as follows:

"*Mr. Vance*—I am directed by the Committee on Patents to move to suspend the rules and pass the bill (S. No. 300) to amend the statutes in relation to patents and for other purposes, as amended by the House Committee on Patents."

[The bill as proposed to be amended was then read; the only notable change in the bill as printed January 24, appearing in section 12, the supplementary fees having been reduced by the House Committee from $50, at the end of four years, and $100, at the expiration of nine years, to $20 and $50, respectively.]

"*Mr. Garfield*—Is it proposed to pass the whole of this bill without the House having any opportunity to debate and consider it?

"*The Speaker*—The motion is to suspend the rules and pass the bill.

"*Mr. White, of Pennsylvania*—Does the bill not change our whole patent system?

"*The Speaker*—That is not a parliamentary question.

"*Mr. Rice, of Ohio*—I desire to ask whether this is the report of the Committee on Patents, and whether the bill as it has been read has the sanction of the committee.

"*Mr. Vance*—It has.

"*The Speaker*—The Chair is only recognizing gentlemen who have the authority of their committees to move to suspend the rules.

"*Mr. Keifer*—Will the gentleman from North Carolina not allow me to offer a single amendment to provide that the bill shall not be applicable to pending causes of action?

"*Mr. Vance*—I have not that authority.

"The question being taken on the motion to suspend the rules and pass the bill, there were—ayes, 67; noes, 79.

"*Mr. Vance*—I call for the yeas and nays.

"The question being taken on ordering the yeas and nays, there were ayes 26; not a sufficient number.

"*Mr. Townshend, of Illinois*—I call for tellers on the yeas and nays.

"Tellers were not ordered, only twenty-six members voting therefor.

"So the yeas and nays were not ordered, and two-thirds not voting in favor thereof, the rules were not suspended."

MR. ROBERT G. HATFIELD.

The architectural profession has lost one of its best known and most esteemed members in the death of Mr. R. G. Hatfield, of this city.

For many years Mr. Hatfield had been a prominent officer of the American Institute of Architecture, of which he was one of the founders, and also member of the American Society of Civil Engineers. His professional writings were numerous, "The American House Carpenter," published some thirty years ago, being among the earliest. A later and more important work on "The Theory of Transverse Strains, and its Application in the Construction of Buildings," enjoys the highest professional favor. His contributions to the SCIENTIFIC AMERICAN and other periodicals were many and valuable, his last, a very ingenious discussion of the origin and nature of the ancient structure known as the Old Mill at Newport, R. I., appearing in *Scribner's Monthly* on the day of his death.

As a constructor Mr. Hatfield was noted for superior knowledge and ability, and was much consulted by his professional brethren in difficult undertakings. The splendid arched iron roof of the Grand Central Railway Depot in this city is regarded not only as a model structure, but as a fine illustration of Mr. Hatfield's boldness and skill as a designer. Personally, Mr. Hatfield was greatly and justly esteemed by a wide circle of friends and acquaintances. His last public service was as Chairman of the Committee of Award in the competition of designs for model houses for workingmen, noticed in another column.

Gary's Alleged Neutral Line.

To the Editor of the Scientific American:

In an article upon "Gary's Motor," page 144, issue of March 8, the "behavior of the nail" is explained by its tendency to fly to the magnet upon approaching the same, but that in leaving the piece of sheet iron, the force of gravitation acts more strongly than the force of magnetic attraction, and the nail consequently falls to the ground. Having, by invitation, witnessed the nail experiment at Mr. Gary's room, I do not think the above theory is correct; inasmuch as the nail, when suspended from the sheet iron armature and at the distance of a few inches from the magnet, shows but little movement during the approach of the armature to the magnet; certainly not sufficient to cause its dislodgement by the force of gravitation. My own explanation, given to the exhibitor at the time of witnessing the experiment, is that the sheet iron armature, being polarized by the magnet, in turn polarizes the nail which is suspended from it, and that this polarity (of the nail) is necessarily reversed when brought within the direct control of the magnet, or sufficiently near thereto to be more powerfully affected by it than by the sheet iron (the power of which to increase its ability to control the nail, as they both approach the magnet, depends upon its thickness and area.)

Now, as the nail cannot have its polarity reversed and remain suspended from the sheet iron (by which it was originally polarized) throughout the process, by attraction, then, at the point of neutralization, the nail drops, without, of course, any change in polarity of the sheet iron armature, or the existence of any so-called "neutral line." M.

Boston, Mass., March 3, 1879.

AMERICAN INDUSTRIES.—No. 9.

SMALL TOOLS.

The industry under consideration is peculiarly American. It is representative of a class of establishments that have given our manufacturers a world-wide reputation for goods that are both cheap and reliable. This success is mainly due to the system of manufacture inaugurated here some years since, and which seems to thrive better in this country than anywhere else. But for the special machines, the system of inspection, and assembling we should still have the old-fashioned tools, with the defects consequent upon fitting one piece to another, and the prices would be far higher than the more perfect machine-made article now demands.

The Miller's Falls Company, of Miller's Falls, Mass., manufacture a great variety of useful tools, most of them being of the smaller sort, such as are of the most general utility. A few of these, shown in the title page engraving, will be recognized by most of our readers as familiar objects. Among these are breast drills, bench drills, Barber's bit brace, the ratchet brace, parallel vises, the miter box, the screw jack, all of which are so well known as to need no special description. The saw in the background of the left hand view is known as the Rogers scroll saw. It is a marvel of cheapness; the frame, of elegant design, is entirely of iron; the shaft, treadle motion, and drive wheel are well fitted, and the whole affair, while it is substantial and really good, is sold for $3. We mention the price as this machine exemplifies in a remarkable manner what has already been stated. In the upper right hand corner of the engraving is shown a Lester scroll saw, which combines a saw and a lathe; a hand scroll saw and a small drill are shown on the floor.

The two views in the lower part of the engraving represent two forms of parallel vise made by this company, also the well known tool chests which are used by both young and old.

The works of the Miller's Falls Company contain the most modern machinery for doing work rapidly and accurately. The middle view at the top of the engraving shows a turret lathe, one of the most useful tools for this kind of work.

The special use of the one shown is to make small universal chucks, such as are used with small lathes, hand drills, bit braces, etc. In five minutes from the time a bar of iron is put through the hollow mandrel of this lathe it is turned, drilled, tapped, chamfered, turned to the required form, and cut off.

Of the larger views, the right hand one represents the machinery for making various styles of tool handles; the left hand view represents the department in which the different kinds of tools are finished.

The main building of the works is divided into six compartments, separated from each other by heavy brick walls and iron doors, as a protection against the spread of fire. The works are complete in themselves, consisting of iron and brass foundries, blacksmith shops, a tempering shop, pattern, wood turning, machine, grinding, and polishing shops; inspection and stock rooms.

The machinery is driven by turbines having a total of 300 horse power. As an evidence of the success of this establishment it may be mentioned that great numbers of their tools are shipped to England, many of which go to Sheffield, which was once the very tool center of Europe.

The New York warerooms of the Miller's Falls Company are located at 74 Chambers street.

A GLASS MOUNTAIN AND ROAD.

Mr. P. W. Norris, the Superintendent of the Yellowstone National Park, on a recent visit to the capital gave a lecture on some of the natural curiosities of the region over which he presides and is engaged in exploring. Among these may be mentioned as the most novel a mountain of obsidian or volcanic glass, and a road made from this material.

Near the foot of Beaver Lake the explorers discovered this mountain of glass, which there rises in basalt-like columns and countless huge masses many hundreds of feet high from a hissing hot spring forming the margin of the lake, thus forming a barrier where it was very desirable that a wagon road should be, as the glass barricade sloped for some 300 feet high at an angle of 45° to the lake, and its glistening surface was therefore impassable, there being neither Indian nor game track over it. To make the road, huge fires were made against the glass to thoroughly heat and expand it, and then by dashing cold water from the lake against the heated glass suddenly cool the latter, causing large fragments to break from the mass, which were afterward broken up by sledges and picks, but not without severe lacerations of the hands and faces of the party, into smaller fragments, with which a wagon road one quarter of a mile long was constructed, about midway along the slope, thus making, it is believed, the only road of native glass upon the continent.

On reaching the Grand Cañon of the Gibbon river the explorers found the eastern palisade, for about two miles in length, to consist of vertical pillars, hundreds of feet high, of glistening black, yellow, mottled, or banded obsidian or volcanic glass.

This obsidian has been and is still used by the Indians for making arrow heads and other weapons and tools, and the mountain has formed a vast quarry for the making of such instruments or weapons of a quality and quantity unequaled elsewhere.

The lecturer gave a graphic description of "Old Faithful," and other geysers of Firehole Basin, and of the Liberty Cap and other geyser cones, resembling in their grotesque forms the monuments of an extinct race. He also exhibited a number of specimens of minerals found in the park, including chalcedony, amethysts, opals, petrified wood, lava, etc.

A SURPRISE TO MILLERS.

A decided sensation was caused in the United States Circuit Court at St. Louis, Mo., February 25th, during the trial of the great Middlings Purifier case. The American Consolidated Middlings Purifier Company had sued several St. Louis millers for infringement of patent and for damages, which, at the rate of three cents a barrel of flour, will amount to several millions of dollars. On the day named Mr. Rodney Mason, of Washington, leading counsel for the complainants, dismissed the suit against ex-Governor T. O. Stanard, Vice-President of the Millers' National Association, and T. B. M. Kehlor, of the Missouri State Association. The announcement carried dismay into the camp of the defendants, who had looked upon both men as among the staunchest of those engaged in the defense of the case. Ex-Governor Stanard was sued for $150,000, and he compromised by paying $900; Mr. Kehlor made an equally favorable arrangement.

The compromise was effected, it is said, against a written pledge of the two men with the other large millers of St. Louis to resist the complainants' claims. They have been thus associated for four years, and the combined defendants have spent over $100,000 in legal expenses.

SAFETY AT SEA.

At a special meeting of the American Geographical Society, February 27, Lieutenant J. B. M. Mason, of the United States Navy, gave an uncommonly instructive address on the means which inventors have devised, but which ship owners never furnish, for preventing loss of life in case of accident at sea. The address was abundantly illustrated with stereopticon views and life-saving apparatus. Very few, probably, of the large audience, were before aware of the existence of so many approved devices for preventing accident at sea, or for rescuing the victims of shipwreck; and very many of those who had been at sea must have felt the force of the Lieutenant's sarcastic description of the average traveler's anxiety for comfort and indifference with regard to the provisions made or neglected for securing safety. It is because of this happy-go-lucky spirit of travelers that it is possible to say, as Lieutenant Mason did, that there is not a single vessel sailing or steaming from this port or any other that is properly provided with life-saving apparatus.

Lieutenant Mason paid a handsome tribute to our Life Saving Stations as a useful and humane provision for saving life from wrecks on our coast.