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.