tioned. It was continued for many hours, and even days. It was found that at each burst of vapor a minute bubble of gas passed up through the oil without being condensed, this was proved to be nitrogen. To avoid any suspicion about boiling by electrical means, similar experiments were made in which the boiling was produced by a spirit lamp, and similar results were obtained.

He was led to try the effect of boiling an elementary liquid, and bromine occurred as the most promising one to work upon. The temperature of the bromine was first raised till its vapor had driven all the air from the glass tube, when the tube was sealed by the blow-pipe. The bromine vapor on condensing left a vacuum above it. After boiling, a notable quantity of a permanent gas was found to have collected in the tube, and this gas proved to be pure oxygen. The experiment was repeated with chloride of iodine with the same result, only the quantity of oxygen was greater. Mr. Grove also described his fruitless attempts to obtain in this way the vapors of phosphorus and sulphur. He barely alluded to the result on the compound liquids, such as oils and the hydro-carbons, as the fact that permanent gas is given off in boiling such liquids would not be unexpected.

The experiments seem to show that boiling is by no means necessarily the phenomenon that has generally been supposed, viz: a separation of the cohesion in the molecule of a liquid from distension by heat. He believes from the investigation he has made that (except with metals, on which there is no evidence) no one has seen the phenomenon of pure boiling without permanent gas being freed, and that what is ordinarily termed boiling arises from the extracting of a bubble of permanent gas, either by the chemical decomposition of the liquid, or by the separation of some gas associated in minute quantities with the liquid, and from which human means have hitherto failed to purge it. This bubble once extracted, the vapor of the liquid expands it; or, to use the appropriate phrase of Mr. Donny, the liquid evaporates against the surface of the gas.

Mr. Grove's experiments are in a certain sense the compliment of those of Mr. Donny. The latter showed that the temperature of the boiling point was raised in the same proportion as water was deprived of air, and that under such circumstances the boiling took place by bursts or jumps (*soubresauts*). Mr. Grove has shown that when the vapor liberated by boiling is allowed to condense, it does not altogether collapse into a liquid, but leaves a residual bubble of permanent gas, and that at a certain point this evolution becomes uniform. Boiling then is not a result of merely raising a liquid to a given temperature, it is something much more complex. Enough had been shown by his experiments to lead to the conclusion that hitherto simple boiling, in the sense of a liquid being expanded by heat into a vapor without being decomposed, or having a permanent gas eliminated from it, is a thing unknown. Whether such boiling can take place may be regarded as an open question. He was inclined to think that it cannot; that if water, for instance, be absolutely deprived of its nitrogen, it would not boil till some portion was decomposed; that the physical severance of the molecules by heat is also a chemical severance. The constant appearance of nitrogen in water. when boiled off out of contact with air, almost to the last drop, is a matter well worthy of investigation. He would not speculate on what possible connection there may be between air and water. The preponderance of these two substances on the surface of our planet, and the probability that nitrogen is not the inert diluent in respiration that is generally supposed, might give rise to not irrational conjectures on some unknown bond between air and water. But it would be rash to announce any theory on such a subject—better to test any guess one may make by experiment, than to mislead by theory without sufficient data, or to lessen the value of facts by connecting them with erroneous hypotheses.

One hundred and fifty watches per day, or one every four minutes, are now turned out at the Waltham Watch Factory. When the contemplated addition to the company's work is completed, about double the present number of hands—about 550—will be employed.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Fluted Ruffles.—In the manufacture of fluted ruffles and fluted or gauffered trimmings and fabrics generally, it has been common to use, for the purpose of retaining the flutes in place, a thread which, after having been coated with a solution of gum or other adhesive material, is placed in contact with the flutes and caused to adhere thereto. There is no objection to the use of this thread on white muslin goods, but in silk and colored goods the moisture which is in the said thread when it is first applied, frequently produces a stain or discoloration. This invention consists in the manufacture of fluted ruffles without the use of an adhesive thread by pressing down the flutes into a flat or plait-like form at any portion of the width of the ruffle, with such a degree of pressure that the so-pressed portion will retain its pressed form and also the flutes in place, Thomas Robjohn, of Mott Haven, N. Y., is the inventor of this improvement.

Mowing Machine.– This invention relates to a new and useful improvement in adjusting or raising and lowering the cutter bar, and in parts connected therewith, to wit, the brace rod and track-clearer. The invention also relates to an improved draught attachment for keeping the cutter-bar free from the surface of the ground, and also in an improved means for connecting the working parts with the axle of the machine, whereby the use of a framing for the purpose is avoided. James Pine, of Troy, N. Y., is the inventor of this improvement.

Exercising Machine.—The object of this machine is to obtain a device of simple and economical construction which will admit of the lower limbs of the human body being exercised with a view of strengthening them in cases of paralysis and like diseases, and in such a manner that the patient will not suffer from over-exertion in operating the device, but will only bring such muscles and partts into play which are designed to be strengthened thereby. Charles F. Taylor, M.D., of New York city,is the inventor of this improvement.

Springs for Cars and other Purposes.—This invention consists in a series of coil springs of pyramidal form, arranged in rows side by side, each alternate row of pyramids being inverted so as to permit the combination of many springs within a small space. The springs are inclosed in a suitable box or frame, and several series of springs may be employed, arranged above each other with a plate between every series. The boxes are also made in a peculiar manner so as to afford convenient access to any of the series of the springs. These springs appear to possess the merit of strength, durability, simplicity and cheapness. Ulysses B. Vidal, Philadelphia, Pa., is the inventor.

Improved Revolver Fire-arm.—The peculiar feature of this revolver is that it is loaded in front of the cylinder with metallic cartridges, requiring neither the taking out of the cylinder nor the opening of the frame, and it is therefore very convenient. The fulminate priming of the cartridges is contained in a flange extended longitudinally from the rear instead of laterally, as in other fixed ammunition. The hammer strikes upon this flange through an opening in the rear of the cylinder to each chamber. The discharged shells are removed from the chambers by means of a sliding pin which is attached to the frame, and is never required to be disconnected from the arm, and therefore can never be lost. As a handy and durable weapon it cannot be surpassed. It is the subject of two patents, and applications on new points are now pending. The cartridge is the subject of a separate patent. This revolver is made of different sizes and in various styles of finish. We have had a pistol exhibited in our office which is one of the handsomest fire-arms we have ever seen ; the stock, frame and barrel are most beautifully engraved and heavily plated with silver, the cylinder gilt and the handle made of ivory. It was made by Plant's Manufacturing Co., New Haven, Conn., and is valued at $75. The inventors of this revolver are Messrs. Reynold's, Plaut and Hotchkiss, of New Haven, Conn.

Concussion-bulb for Fuses.—This invention consists in the employment for the fulminate priming of a fuse, of a small glass bulb containing a liquid hermetically sealed and having its exterior coated with a chemical substance. This bulb is broken by the concussion of the shell in striking, and the acid coming in contact with the potash and sulphur produces a mixture which at once takes fire and ignites the charge. George P. Ganster and Isaac S. Schuyler, of New York city, are the inventors of this improvement.

NEW BOOKS AND PUBLICATIONS.

The Management of Steel. By George Ede. D. Appleton & Co., Publishers, New York.

This work is a re-publication from the second English edition, and its character stands high abroad as a clearly-written and intelligent book upon the subject it treats of, which, it is almost needless to add, is a very important one. The art of working steel is yet in its infancy, and any information which will add to the general stock will be gladly received by all practical persons. This book is especially valuable to many mechanics for the reason that it gives specific instructions upon certain intricate and difficult kinds of work; hardening, annealing, shrinking and forging steel are treated in a lucid and vigorous manner. The author, Mr. Ede, has been for twenty years employed in the Woolwich gun factories of England, and may be considered as an authority upon the subject he writes of. Price 50 cents.

Atlantic Monthly. Ticknor & Fields, Publishers, Boston, Mass.

This excellent magazine deserves more commendation from us than we can find space for. It is gaining popular esteem very rapidly while it steadily maintains its high character as a monthly periodical. The "House and Home Papers" of Mrs. Stowe are not only interesting but instructive, and combine the useful with the sweet in a most agreeable way. In the May number, which we have received, "A Cruise on Lake Ladoga" opens a new country to the eyes and ears of "fireside travelers," or those who, unable to journey abroad, depend upon others for their enjoyment of this kind. For sale at the bookstores.

Inventive Progress.

"The progress of inventions is one of the most noticeable features of the day. The Scientific American of last week had fully three pages of its reading matter filled with inventions for which patents had been granted. These improvements do not relate principally to the destructive art, but sweep over the whole field of industrial activity. Among the names published we notice those of ten or twelve Jerseymen, showing that this State furnishes her "quota" of inventors as well as of brave volunteers. Messrs. Munn & Co., proprietors of that journal, have built up a prosperous business which has out distanced all competition in both hemispheres. We can recall to mind at least half a dozen attempts made to supplant them as publishers and patent-agents; but all have languished and finally given up the ghost. So much for a conception at the right moment, diligently pursued through successive years, in a spirit of accommodation to the public as well as of advantage to themselves."

[We copy the above from the Paterson (N. J.) *Daily Press*, a most excellent paper, and we thank Messrs. Wright & Chiswell for their kind testimonial. —Eds.

SPECIAL NOTICE.

Luke V. Newton, of New York City, has petitioned for the extension of a patent granted to him on Aug. 20, 1850, for an improvement in preparing the face of metallic types, engraved plates, &c.

It is ordered that the said petition be heard at the Patent Office, Washington, on Monday, Aug. 1, 1864.

All persons interested are required to appear and show cause why said petition should not be granted. Persons opposing the extension are required to file their testimony in writing, at least twenty days before the final hearing.

A most extraordinary incident occurred during the attack of a rebel iron-clad ram on our fleet in Albemarle Sound. Capt. Flusser, of the *Miami*, fired an 11-inch gun at the iron-clad, which rebounded from the sloping sides and struck the unfortunate officer, killing him at once.