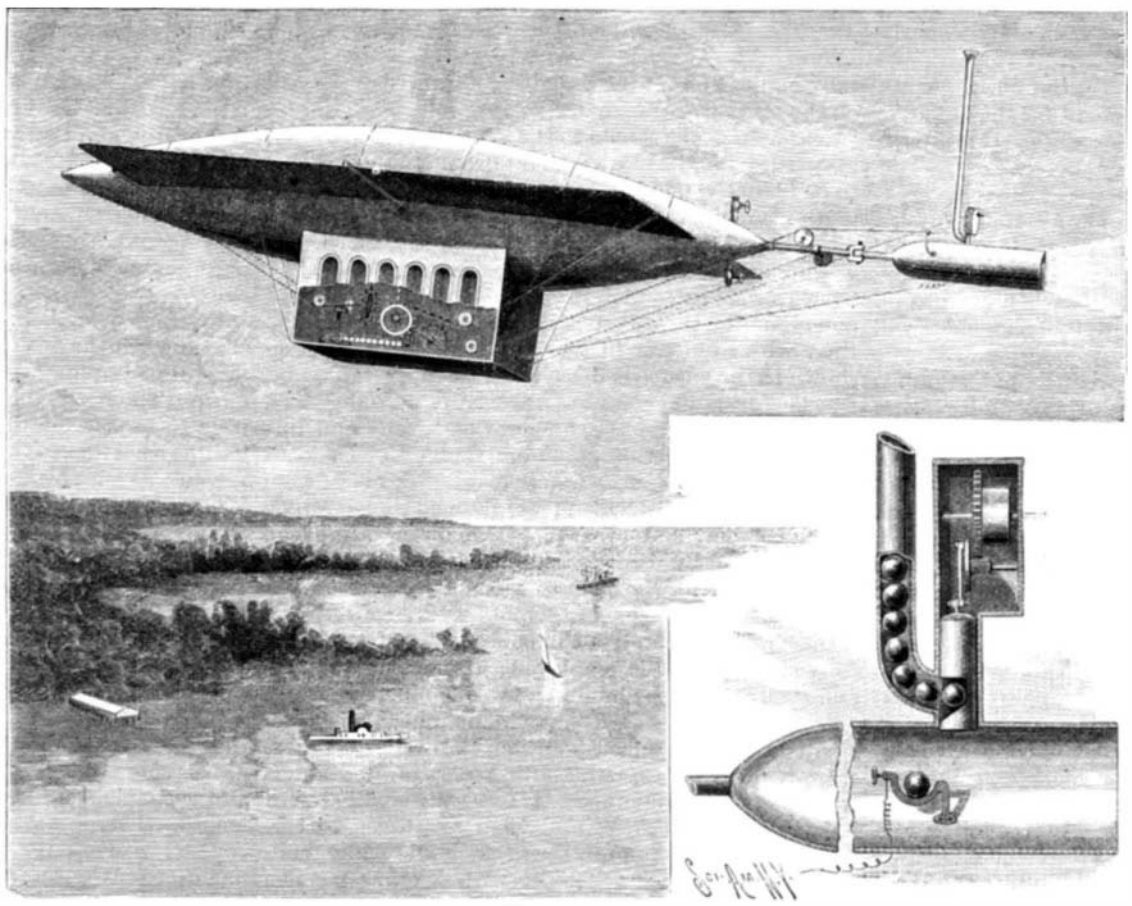
A NEW AIR SHIP.

The principal feature of the means of aerial navigation shown in the picture consists in the method of propulsion employed, the power for this purpose being afforded by discharges of small and readily regulated quantities of a high explosive, of which a very considerable amount can be carried without adding greatly to the weight of the whole apparatus. The balloon portion of this air ship is of a cigar-shaped model, having a framework of aluminum, covered with oiled silk or other suitable fabric, or with a thin envelope of aluminum, and is of sufficient size to afford, when filled with a light gas, a lifting power corresponding with the weight of the car and the load it is proposed to carry, all of the apparatus and fittings being of the lightest possible construction consistent with the necessary strength. At each side of the body are wings or side planes, to guide the air ship up or down, according to the inclination given them, these vanes turning on a horizontal axis, consisting of an aluminum tube extending through the center of the body. As seen in the broken-away portion of the car shown in the main view, wire ropes or cables from these side vanes extend over pulleys with gear wheel connections within the car, so that the operator, by the movement of a lever, can regulate to a nicety the inclination of the vanes.

The propelling apparatus, in which the main novelty of this invention lies, is supported upon a hinged arm at the rear. It consists, practically, of a horizontally arranged mortar-like tube, forming the end of the arm, and above this tube, as shown more in detail in the small view, is a tubular magazine containing globular or pellet-like charges of a high explosive, with the mechanism for regulating their supply to the discharge tube. The explosions, as they take place in this tube, exert a powerful backward pressure upon the air, which may be more or less nearly continuous, according to the power to be applied to propulsion and the rate of speed sought to be attained, an air cushion back of the explosive chamber protecting the machine from shock. The rate of discharge may be controlled through a wire extending to within easy reach of the operator within the car, while light wire cables extend from the discharge tube over pulleys to a gear wheel steering apparatus in the car, the arrangement being such that the tube may be readily swung to one side or to the other as desired, the direction of the ship in the air being thus conveniently controlled. The discharge tube thus at the same time supplies the motive force and constitutes the rudder. The charges are fed automatically to the point of discharge, the pellets dropping into a shallow cup or basin, which is made by the contact to complete an electric circuit, whereby the firing is effected, each pellet completing the circuit for its own explosion and at once breaking the circuit.

It is the belief of the inventor that with one of these machines, possessing a minimum of weight, owing to the absence of machinery and the use of aluminum instead of iron or steel for the framework and all the working parts, and provided with the maximum of power, due to the nature of the force employed, a speed can be attained excelling even that of bird flight. The car may be gradually reduced in width fore and aft to a sharp vertical edge at each end, offering the least possible resistance to motion, and it is suspended by aluminum wires and cords from the entire length of the body. It is designed also that machines of this type may be used for carrying freight and for regular passenger service, and their value will be obvious for such purposes as military observations, carrying of mails and dispatches, etc. This new air ship has been patented in the United States and the principal European countries by Dr. S. B. Battey, of No. 39 West Twenty-seventh Street, New York City.



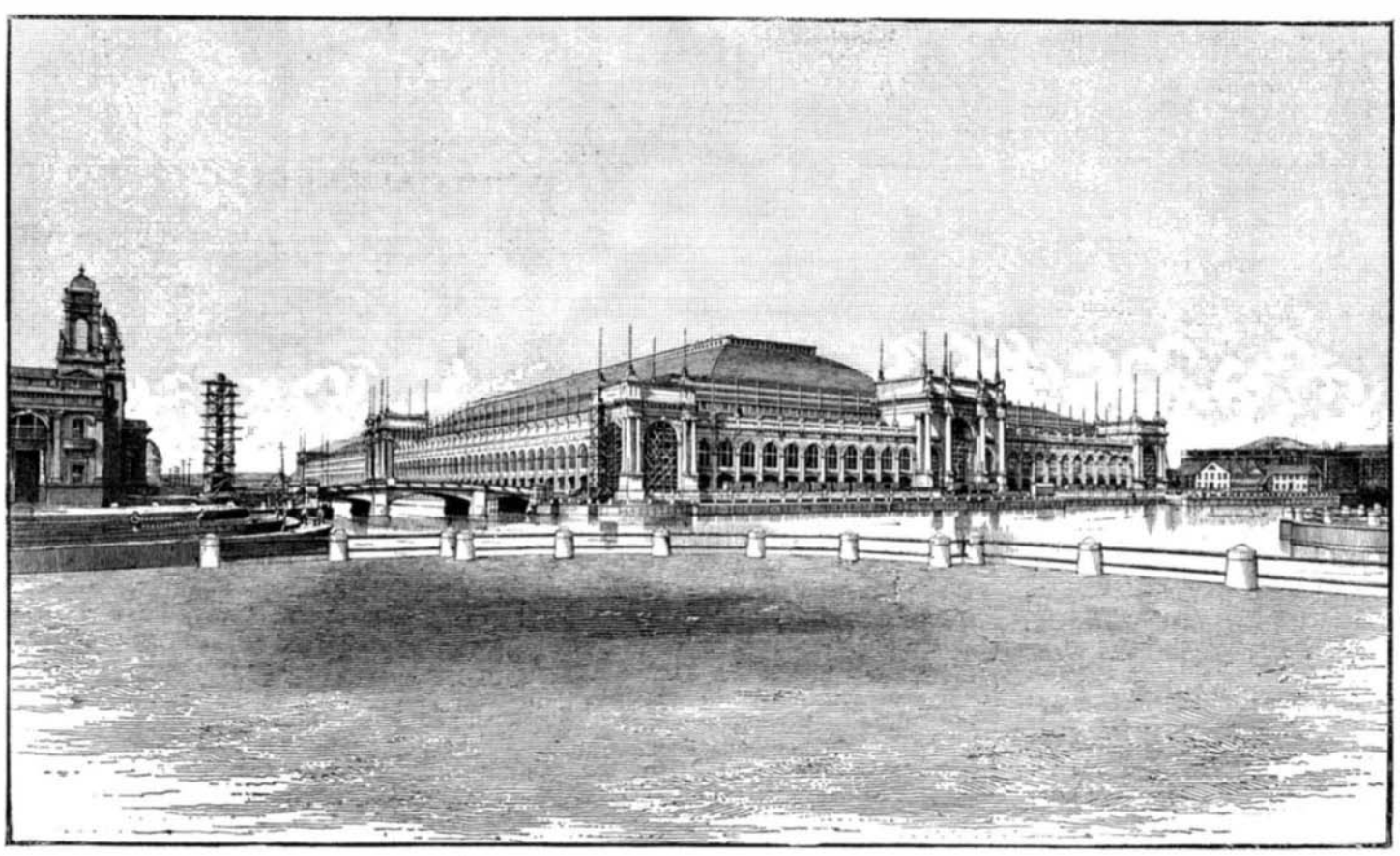
BATTEY'S AERIAL SHIP

THE WORLD'S COLUMBIAN EXPOSITION.

With the close of the present week the great exposition will have been dedicated, with official ceremonies and a great civic parade, followed by a military parade, dignitaries being present from all parts of the world, and the representation from all parts of our own country being in every way worthy of a nation of nearly seventy million people, the most intelligent and the most prosperous, as a whole, of any people in the world. The enterprise is now, therefore, fully before the world as one which all classes and those of every section are earnestly endeavoring to promote, in the full confidence that the fair, of whose great extent and popularity there are already such abundant evidences, will be one which will do full credit to the whole country.

The inaugural exercises proper were arranged to take place in the great Manufactures and Liberal Arts Building, shown in the accompanying illustration, and in which one hundred thousand people could be readily accommodated. It is the largest exposition building ever constructed, covering nearly thirty-one acres of ground. To get it ready in time for the opening exercises was a vast undertaking, and has required many weeks of high pressure service on the part of the various heads of the construction department, with their army of assistants, but the business was so thoroughly organized that there has been at no time any possibility of failure. And this is only one of a great number of large buildings, nearly all of which are now approaching completion, whose construction has been carried on so rapidly that they seem to have almost sprung out of the ground as if by magic. But there will be nothing cheap or unsubstantial in the appearance of the structures which have arisen in such a marvelously short space of time, for their staff coatings will give them the appearance of stonework of great solidity, combining the highest architectural effects with the most artistic representations of the sculptor's art.

The statue for the Administration Building, shown in our view, is but one of a great number of groups of striking beauty and appropriateness with which nearly all the buildings are to be richly embellished. A large number of sculptors has been employed upon this work for several months past, and now, as the designs are being sent forth from the various studios in their completed form, the work gives one a vivid



MANUFACTURES AND LIBERAL ARTS BUILDING, LOOKING NORTH FROM THE SOUTHWEST CORNER.

impression of the thoroughness and elaboration of the plans under which the whole exposition business is being carried on. The Forestry Building has been for a considerable time one vast sculptors' studio, but other buildings are also occupied for this purpose, and the various structures, as they approach completion, become temporary workshops for an almost inconceivable variety of trades and callings.

Among the buildings whose erection has been decided on at the last hour is a special structure for the shoe and leather trades. The building is to be 150 by 575 feet and two stories high, costing over $100,000, subscriptions for this amount having been obtained from members of the trades which will make their display in this special structure. It is expected that this building will be completed in three months.

About twenty-five Japanese workmen in native costume have arrived to erect the building for their country. It is to cost $60,000 and will be in itself an exceedingly interesting exhibit. Surrounding the building will be a sample of Japanese gardening upon which an additional $12,000 will be expended. The structure will be devoted to the display of art and ethnological exhibits of Japan and after the Fair is to remain in the possession of the park commissioners. The total appropriation of Japan to the Fair is $630,000.

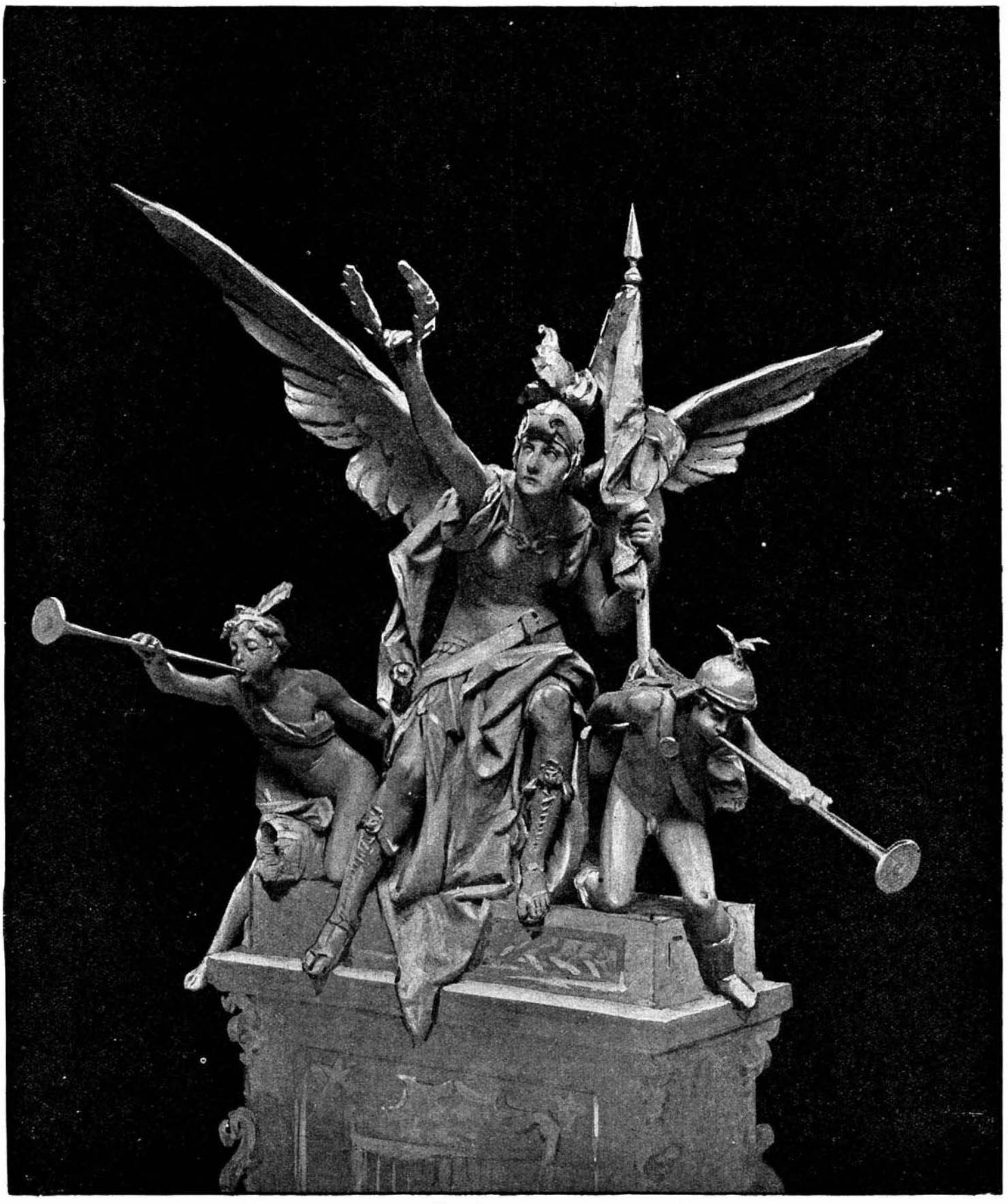
A huge chest, which is to be the repository at the World's Columbian Exposition of the priceless documental treasures of the nation, is being made in Rochester, N. Y. It is to contain the original Declaration of Independence, the draft made by Thomas Jefferson, the Constitution of the United States, which has never before left the State Department at Washington, and other historical documents. The chest is ten feet high, three feet six inches broad and deep, and is made of steel. The chest will be sent to Washington to receive the documents. Then a special car will be provided, and under a guard composed of several army officers it will be taken to the Fair.

A model of St. Peter's, made from the original plans of Michael Angelo, will be exhibited in the Midway Plaisance, in a building 50 by 100, to be erected by L. De B. Spiridon.

John Phillipson, who is the head of one of the oldest carriage building firms of Newcastle, England, has consented to loan to the World's Fair his unique collection of drawings, paintings and models that illustrate the development of locomotion on wheels during the last fifty years.

One thousand samples of wheat, corn, flour and oil producing grain from the provinces of Buenos Ayres and Brazil will be exhibited at the Exposition.

The largest and most powerful locomotive ever built, weighing 195,000 pounds, exclusive of the tender, will be on exhibition in the Transportation Building.



STATUE FOR THE ADMINISTRATION BUILDING—CARL BITTER, SCULPTOR.

The Estimation of Sulphur in Burnt Pyrites.

BY G. LUNGE.

The author has carefully examined Watson's method (heating with sodium bicarbonate and titration of the alkali not converted into sodium sulphate) and, in conjunction with Schmidt, has succeeded in removing the sources of error which hitherto attended the method, so that the following modified process gives accurate results and is thoroughly to be relied upon. About 3·2 grms. of the substance are intimately mixed with 2·0 grms. bichromate of known strength in a nickel crucible capable of holding 20 grms. and heated first for 10 to 15 minutes with the top of the flame just touching the bottom of the crucible, so that the bicarbonate alone is decomposed, and then for 15 minutes with a stronger flame until the whole mass is red hot. Fusion, which does not easily take place when a nickel crucible is used, must on no account be allowed to occur. In order to avoid mechanical loss, the crucible must remain covered throughout the whole operation; stirring is not necessary. The mass, which is emptied into a porcelain basin after cooling, is black and porous if the operation has been properly conducted; if too little heat has been employed, it forms a black, almost insoluble cake, as hard as glass. It is then extracted by boiling with water, and, if necessary to obtain a clean filtrate, a concentrated solution of salt carefully neutralized with hydrochloric acid and methyl orange added, after which it is filtered through a filter paper moistened with salt solution, the precipitate being stirred up so as to close the pores of the paper at once; if, notwithstanding this, the filtrate comes through greenish yellow, it must be passed through the paper again. The boiling with water is repeated several times, the residue washed with dilute salt solution and the united filtrates titrated with N-5 hydrochloric acid, the faintest possible coloration of the indicator being used.

The determination of sulphur in burnt pyrites by means of nitric acid is stated by the author not to give such accurate results as has hitherto been supposed.—*Ztschr. Angew. Chem.*

Recent Decisions Relating to Patents.

WANT OF NOVELTY.

Letters patent No. 249,278, issued November 8, 1881, to Albert E. Wallace, cover, in claims 2 and 3, a ball-bearing device for vehicles, the balls running in V-shaped grooves, the groove upon the axle being made by two sleeves sliding toward each other, the inner sleeve resting upon the hub of the axle and the outer one connected with the crank, both the crank and the sleeve being threaded with a screw, whereby the sleeve may readily be moved toward or from its fellow, furnishing a means of adjustment to compensate for any wear of the grooves and balls. *Held*, that the patent is void for want of novelty over the English patent of November 14, 1878, to James Bate, in which the axle groove is formed by two cones, one being adjustable by means of a screw, in substantially the same manner. 1.

Letters patent No. 177,194, issued May 9, 1876, to Oscar Boehme, for an improvement in the manufacture of balls and rosettes of yarn, consisting in the use of a funnel-shaped tube, through which the yarn is drawn, so that it comes out of the small end in a compressed condition, ready to be bound and cut, are void for want of patentable novelty. 2.

IN PENNSYLVANIA.

Where one has received a patent for an invention, the fact that there was in existence in the Patent Office, at the time the patents were applied for, an abandoned application by another person, together with models, for a patent for substantially the same invention, does not make the patent void for want of novelty, since to invalidate a patent the want of novelty must be such as shows that the invention was known to the public. 3.

Letters patent No. 274,048, issued March 18, 1883, to Edwin R. Stilwell, cover a live steam heater or feed-water purifier, connected with the boiler by steam pipes, and having a series of pans vertically arranged above the filter, and a space or chamber above the pans, and water inlet, connected to the steam dome by a pipe, so as to discharge the gases from the top of the purifier directly into the boiler. *Held*, that the gas discharge pipe was both a novel and useful feature, and such an advance over letters patent No. 66,998, issued July 23, 1867, to the same inventor, as well as over all other prior inventions, as to sustain the validity of the patent. 4.

Letters patent No. 432,451, to Herman Tappan, for improvement in perfume holders, consisting of a device in the form of a lantern, comprising a bottle or flask to hold the perfume, a base piece, a collar around the neck of the bottle, a cap adapted to fit upon the neck of the flask, and screwed down thereon, and pressing a packing ring down on the cork, and on the upper part of the flask, the collar and the base being connected by curved rods, provided with hooks, adapted to be sprung into suitable openings in the collar and base, and serving the double purpose of holding the parts together and forming a cage for the glass flask, in view of the prior state of the art, is void for want of novelty. 5.

Letters patent No. 289,802, issued December 11, 1883, to Philo D. Beckwith, for improvements in a heating stove designed to convert a wood-burning stove into a coal burner, and consisting of a flaring ring cast in two sections, which fit into the top of the fire pot, in which the coal basket, cast integral, is suspended, the ring having legs which rest on an annular flange at the base of the fire pot, and having holes in its periphery, into which pintles, cast on the underside of the coal basket, pass, so as to hold the ring together, are not void for want of novelty. 6.

INVENTION.

Letters patent No. 197,289, issued November 20, 1877, to A. L., G. M., and O. E. Peters, are for an anti-friction journal box, with bearings consisting of elongated rollers, whose relative positions, as they revolve round the axle, are maintained by inserting each end into a ring by means of a small bearing. The rollers have beveled ends, and the nut which retains the wheel on the bearing is beveled to conform therewith, and the bearing or axle at the inner ends of the rollers is made with a beveled shoulder. The second claim covers "the bearings with the shoulder beveled or notched, combined with the nut, or its equivalent, correspondingly beveled or notched." *Held*, that this device contained no patentable invention over the Alcott patent of March 29, 1870, which also had elongated rollers with beveled shoulders, combined with a beveled nut or its equivalent. 7.

Reissued letters patent No. 11,047, granted to the Electrical Accumulator Company, as assignee of Joseph Wilson Swan, December 17, 1889, claiming a perforated plate for secondary batteries, having the perforations extending through the plate, and the active material packed in the perforations only, cover a patentable invention. 8.

The fact that, before the date of this invention, Prof. Eaton had packed active material in perforatious extending through the plate, at the same time covering the surfaces thereof, and that Mr. Brush had packed it into grooves in the plate without covering the surfaces, does not show a want of invention in the idea of confining it entirely to perforations extending through the plate, since this apparently slight change avoided the difficulties before encountered, and produced an electrode which has, to a great extent, superseded all others, and has become the electrode of commerce. 9.

Claim 1 of patent No. 360,036, for method of rolling side-bearing girder rails, consisting in rolling down the metal forming the side tram in rolls provided with passes, in one or more of which that portion of metal forming the offset or head of the rail is subjected to elongating action, and that portion only forming its side tram is subjected to displacing or dummy action, does not involve patentable invention, since it was old to roll girder rails with a dummy action on both the head side and the tram side, and it was old in other forms of rails to turn the whole lateral flow of metal to the tram side, and the changes necessary to accomplish this result in the rolls used for rolling girder rails were obvious to a skilled mechanic. 10.

Letters patent No. 145,029 and No. 341,559, issued to Peter K. Dederick, November 12, 1889, and May 11, 1886, respectively, the latter being upon a divisional application for an improvement in horizontal "continuous" baling presses, cover, as the gist of the invention, a device consisting of a loose connection, as a chain or rope between the toggle and the horse lever, so that the toggle is pulled back and forth across the center line by the vibration of the horse lever. *Held*, that, in view of the fact the press has gone into extensive use, the device must be considered to have patentable invention, over the somewhat analogous device shown in patent No. 261,323, issued July 18, 1882, to George Ertel, and which is adapted to an upright press. 11.

Letters patent No. 200,119, issued February 12, 1878, to Ashton, for an improvement in safety valves, in so far as they cover, in claim 1, merely a combination of an under-discharge pop valve, an inner casing, and an outer casing with a suitable outlet, are void for want of invention, in view of the patents to Ashfield (No. 97,472, December 7, 1869), to Prescott (No. 121,659, December 5, 1871), to Guels (No. 195,003, September 11, 1877), and English patent No. 891, of August 23, 1872, to Giles. 12.

Letters patent No. 185,576, issued December 19, 1876, to Reuben H. Plass, for an improvement in seats and backs of chairs, and claiming simply the substitution of vulcanized fiber for veneers, coated paper, metal, etc., are void for want of invention, as the application of an old material to a new use, as a mere substitute, is in no sense an invention or discovery. 13.

1. Pope Mfg. Co. *v.* Gormully & Jeffery Mfg. Co., 12 Supreme Court Reporter, 643.
2. Rochester Coach Lace Co. *v.* Schaefer, 50 Federal Reporter, 106.
3. Harrison *v.* Kennedy, 24 Atlantic Reporter, 66.
4. Stilwell & Bierce Mfg. Co. *v.* Brown, 49 Federal Reporter, 738.
5. Tappen *v.* Bean, 50 Federal Reporter, 103.
6. Lee *v.* Northwestern Stove Repair Co., 50 Federal Reporter, 202.
7. Pope Mfg. Co. *v.* Gormully & Jeffery Mfg. Co., 12 Supreme Court Reporter, 637.
8. Electrical Accumulator Co. *v.* N. Y. & H. R. Ry. Co., 50 Federal Reporter, 81.
9. Electrical Accumulator Co. *v.* N. Y. & H. R. Ry. Co., 50 Federal Reporter, 81.
10. Johnson Co. *v.* Tidewater Steel Works, 50 Federal Reporter, 90.
11. Dederick *v.* Gardner, 50 Federal Reporter, 96.
12. Ashton Valve Co. *v.* Coale Muffler and Safety Valve Co., 50 Federal Reporter, 100.
13. Vulcanized Fiber Co. *v.* Taylor, 49 Federal Reporter, 744.

Oil and Iron Stains in Cotton Cloth.

Oil stains in cotton cloths are well known difficulties to every bleacher and dyer, and it is the general experience that their complete removal is effected in the keiring process. This is absolutely certain where the oil stains have been caused by animal or vegetable oils and greases, as in this case, under the circumstances obtaining in keirs, the saponification of these oils completely removes the stains. Not quite so simple is the case if the stains are caused by mineral oils. These are incapable of saponification, but as soap solutions (especially those of alkali) dissolve considerable quantities of mineral oils, it is generally assumed that the resin soap employed in the process of keiring emulsifies, and eventually dissolves also these stains. This may be true as long as the stains are fresh, but it does not apply to old stains, which, through long exposure to the air, have undergone oxidation. Cloth containing such mineral oil stains cannot be effectively dealt with in an open keir, although, in a pressure keir, and conditional to a liberal supply of resin soap, the stains practically disappear, *i. e.*, they can no longer be seen, and, in the process of printing or dyeing such cloth, nothing occurs that would indicate that these oil stains are still in existence. Iron stains, perhaps, do not occur so often in cloth as oil stains, and may prove a great nuisance occasionally, but, under ordinary circumstances, their removal is easy enough. If the stains are few and far between, they are treated one by one with a moderately strong solution of oxalic acid, the piece being subsequently washed. If there are too many of these stains in a piece to apply this treatment, padding in a bath of oxalic acid at 5° Tw. or in bisulphite of soda at 7° Tw. will answer, but, if oil and iron stains appear in the same piece, forming, as it were, one single stain, the question of getting and of these combined stains is, in most cases, a matter of very considerable difficulty, the oxidized oil retaining the iron stain even against concentrated solutions of oxalic acid or strong sulphurous acid; even the most powerful agent for removing iron stains, a solution of tin oxalates in hydrochloric acid, has not the slightest effect on these compound stains. I may at once say that I do not know of a case of these stains ever having been found in gray cloth, or having been produced in the course of the bleaching process, although the single oil or iron stains are common enough at this stage. But the compound stain inevitably forms when oil-stained cloth is dyed with an iron mordant. The faintest trace of an oil stain left in the cloth can be found out by treating a suspected sample in a bath of ferrous or ferric sulphate, and producing the well-known iron buff by afterward passing through weak soda carbonate. As a rule, the stain does not show in the buff, but, after stripping the color in any suitable acid bath, a bright iron stain remains wherever the cloth retained the least trace of an oil stain. From this it is clear that, in the majority of cases, these compound stains will never be noticed, unless the cloth is stripped of its dye. Unfortunately, the latter process is frequently necessary in the case of drab twills, which have, at times, from some unaccountable reason, an awkward tendency to bleach in the folds, or to come up a wrong shade in dyeing. For the purpose of redyeing such pieces, the color is stripped, and then the oil stains become visible as bright iron stains. On redyeing these pieces in the manner generally used for this class of goods, by first giving two ends in a mixed bath of fustic, sumac, and annatto, and afterward fixing in a bath of ferrous sulphate, these iron stains do not disappear, but show as ugly olive patches. That these stains show only in the second dyeing is easily accounted for, as they now contain twice as much iron as the rest of the piece. It is, therefore, evident that, before redyeing pieces stained in this manner, it is absolutely necessary to first remove these stains. I have already mentioned the obstinacy with which these stains resist all ordinary agents, and the cause of this, no doubt, is that we have the iron here in the form of an iron soap. Taking this into consideration, there is no doubt that the iron stain will only yield if treated with an agent which, at the same time, loosens the oil stain. After a great many experiments, I found that by padding such pieces in a hot solution of one part of soft soap, one part of glycerine, and three parts of water, taking through squeezing rollers, letting lie for twenty-four hours, then washing, the iron stains, together with the oil stains, are completely removed. The *rationale* of the process will be readily understood if we remember the great ease with which oils of every description dissolve in solutions of glycerine and soap, and also the capability of alkaline glycerine solutions to dissolve ferric oxide in large quantities. The price of the process amounts to about 3s. per 100 pounds of the cloth, and from this the price per piece may easily be calculated, the weight of a piece varying from 26 to about 80 pounds. The whole difficulty about these compound stains would, of course, best be dealt with by taking care to remove every trace of oil in the cloth in the keiring process, but, as I have already remarked, this is a matter of considerable difficulty in the case of mineral oil stains, although pressure keirs are, as a rule, fairly efficient in this respect. From experiments carried out on a large scale, it appears, however, that this difficulty can be overcome by deliberately increasing the mineral oil stain in the gray cloth by adding a vegetable oil to it. Treatment, even in an open keir, is then quite sufficient to remove every trace of an oil stain.—*Weber, in the Jour. Society of Chemical Industry.*

A Telephone Fifty Years Ago.

The first telephone in any section of the country is thus described by a citizen of Northampton, Mass.: "A little more than fifty years ago the employes of the Arms Shoe Manufactory, at South Deerfield, beguiled their leisure hours by kite flying. Kites large and small went up daily, and the strife was to see who could get the largest. The twine which held them was the shoe thread spun and twisted by the ladies of the village. One day to the tail of the largest kite was attached a kitten, sewed in a canvas bag, with a netting over the mouth to give it air. When the kite was at its greatest height, some two hundred feet or more, the mewing of the kitten could be distinctly heard by those holding the string. To the clearness of the atmosphere was attributed the hearing of the kitten's voice."

Microscopic Notes.

At the recent Rochester soirée of the American Microscopical Society, the *Microscopical Journal* says, there were at least a hundred microscopes, and every one of them was besieged by a line of eagerly curious men and women.

In one of the microscopes shown by Professor Griffith was a bouquet of flowers. It was made of the scales of the butterfly, arranged with the most wonderful artistic skill in a space no bigger than a pinhead. Another microscope revealed the Lord's Prayer through a pinhole. The exhibit which attracted the largest share of attention, and which, perhaps, was the most instructive, was a series of nine microscopic objectives interspersed with drawings showing the growth of the starfish at all stages. This exhibit was prepared by Professor Charles Wright Dodge, and it was besieged all the evening by throngs of spectators. You had to "get in line" and gradually work your way along.

Another exhibition which attracted much attention was the circulation of blood in the tail of a fish, shown by William Drescher. This was accomplished in a most ingenious way. A living goldfish was securely fastened in a small vessel containing just enough water to keep it alive. Its tail was projected over the side of the vessel, pressed between two small pieces of glass and firmly fixed under the microscope. The power of the microscope was so high that it resolved the blood, seen through the transparent covering of the fish's tail, into countless little corpuscles, which gave it the appearance of multitudinous grains of sand following each other in and out and round about in endless procession up one aisle and down another, constantly twisting and turning. An extra goldfish lay in a pail of water by the side of the microscope, so that the fish on duty might be relieved should he give signs of failing vitality. Mr. Drescher stated that a fish would ordinarily accommodate the investigator in this way for an hour or an hour and a half. At the other end of the room was exhibited a frog's foot in similar fashion.

Professor Seaman, the secretary of the society, to whose energy much of its vitality is due, exhibited a firefly under his lens. He has made a special study of phosphorescent light in organisms, and says that the number of such insects is much larger than is generally supposed, and that the firefly is by no means alone in his glory.

Professor Rogers, the microscopic mathematician, exhibited one twenty-fifth of an inch ruled off into 100 equal parts—a subdivision of the inch into 2,500 equal parts. Professor Rogers does this work with a machine of his own invention, cutting his lines upon gold with a diamond. He uses gold because it is more easily reducible to a finely polished surface.

Professor Claypole exhibited the gizzard of a black beetle and the eye of a crayfish, which were shown by his twin daughters, who are accomplished microscopists.

Sarah F. Whiting exhibited the eye of a beetle in which a little cross marked on the glass beneath it was reflected 1,000 times. It would be difficult to catch the literally Argus-eyed beetle asleep.

Before the society Professor Rogers read a paper on the "Use of the Microscope in the Workshop." The speaker stated that he had for some years advocated a more extensive use of the microscope in the ordinary operations of mechanical construction. His paper was an enumeration of the different mechanical operations in which he found the use of the microscope profitable. Among those specified were:

First, to divide an index wheel into 1,000 equal parts; second, in setting the ways of a large planer horizontal; third, to ascertain whether a piece of planed work has its surface truly planed before the piece is taken from the planer; fourth, to ascertain whether the planer planed a piece of metal in a straight line; fifth, to plane two surfaces exactly alike; sixth, to set the line between the centers of a lathe parallel with the ways; seventh, to test the turning of a true cylinder; eighth, to test the accuracy of the screw of a common lathe.

As an illustration of the last point, the speaker described his test of a precision screw twenty-one feet in length, made by Pratt & Whitney, of Hartford, for R. Hoe & Co., printing press manufacturers. This screw, considering its great length, was found to be of exceptional accuracy.

Professor Clark Bell, of New York City, read a paper on "Blood and Blood Stains." Red corpuscles were first discovered in the human body in 1673. Oval and nucleated corpuscles were found in birds and fishes, reptiles, etc., but not in mammals.

VIBRATORY THERAPEUTICS.

Among all the methods, more or less odd in appearance, applied to the treatment of nervous diseases, there are few more original than the one that has been employed for some time at the Salpetriere by Professor Charcot; it is the treatment by mechanical vibrations.

There is a serious disease of the nervous system, characterized by an incessant trembling of the hands, a stooping attitude, and an odd gait, that makes it seem as if the invalid was going to precipitate himself head foremost. It is the trembling palsy, also called Parkinson's disease, a sort of painful nervous disorder that deprives the unfortunate who is afflicted with it of rest and sleep. Mr. Charcot a long time ago learned from some invalids who were troubled with this infirmity that they derived decided relief from long rides on a railroad or in a carriage. The more the vibrations caused in the compartments by the train running at full speed, and the more the carriage was jolted over an uneven pavement, the more the relief experienced. At the end of a day's journey they felt better and experienced an inexpressible comfort. One of them conceived the idea of having himself wheeled about for hours in one of those heavy carts used for carrying paving stones. Contrary to the experience of all travelers, those afflicted with trembling palsy felt fresher and more active on alighting from the cars. The longer the trip lasted, and the worse the line, the more durable was their improvement.

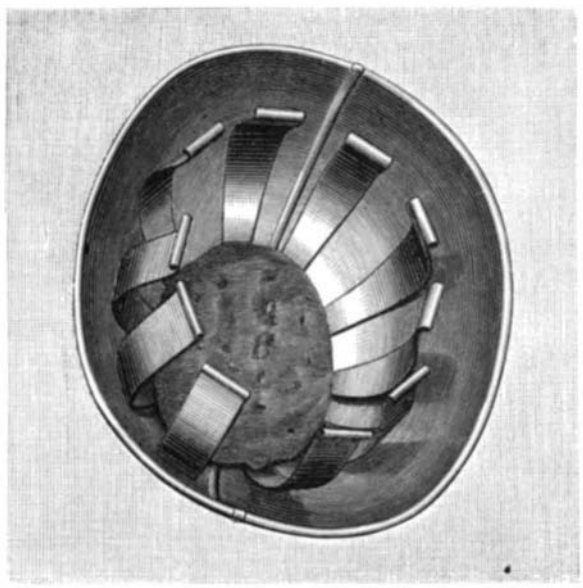


Fig. 2.—INTERIOR VIEW OF THE HELMET.

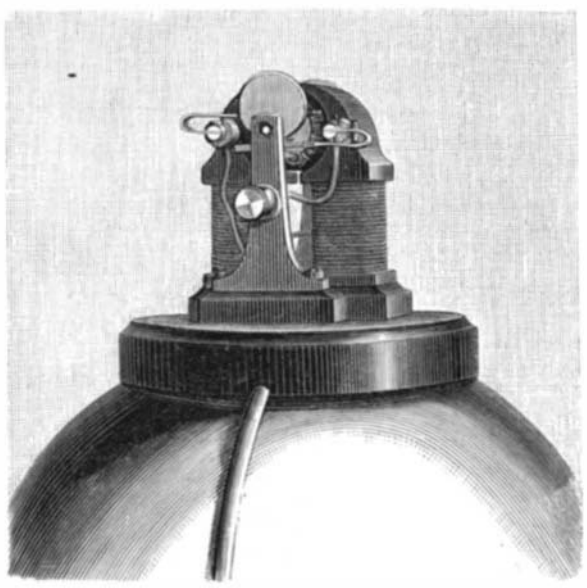


Fig. 3.—DETAILS OF THE ELECTRIC MOTOR.

Fig. 1.—METHOD OF USING THE VIBRATING HELMET.

Such testimony, coming from various sources, was not lost. It was for Mr. Charcot the starting point of a most curious therapeutical application. It was impossible to think of having the invalids carried by rail from Dunkirk to Marseilles, or of making them pass their days in omnibuses. So Mr. Charcot had an arm chair constructed to which a to and fro motion was given by means of an electrical windlass. These motions produce a series of very strong trepidations. It is the motion of the sieve for the sifting of industrial materials. There could be nothing more insupportable for a well person than such shocks, which demolish you, put you out of order, and shake up your intestines, and after a half minute's experience you would ask for mercy. The invalid, on the contrary, lolls in the chair as you would do on a soft sofa. The more he is shaken the better he feels. After a sitting of a quarter of an hour, he is another man. His limbs are relaxed, the fatigue has disappeared and the following night his sleep is perfect.

Treatment by mechanical vibrations is not limited to this malady alone; it seems to be applicable to quite a large number of nervous troubles, more or less well defined, and the neurasthenia of which offers the completest *ensemble*. Long before the invention of the vibrating arm chair, Dr. Vigouroux conceived the idea of submitting hysterical patients to the vibrations of a huge tuning fork. In this way he cured anæsthesias and muscular stiff joints. Other physicians, Boudet, of Paris, and Mortimer Granville, applied vibrating rods to the treatment of neuralgias (facial neuralgia in particular) and headaches. Granville devised a small electric hammer, analogous to the hammer of electric bells, and that was applied to the painful point. Under the influence of the shock, repeated hundreds of times within a short period, the pain ceased.

The method was some time ago singularly improved by Dr. Gillis de la Tourette, a pupil of Mr. Charcot. With the aid of Messrs. Gautier and Larat, two confreres well versed in electro-therapeutical studies, he had an apparatus constructed for the treatment of megrims and nervous headaches; it was the vibrating helmet (Fig. 1). Imagine a helmet of the model of that of old times, and very analogous, as to structure, to the conformator of hatters. It is, in fact, formed of steel plates, that permit of its fitting the head perfectly (Fig. 2). Upon this helmet, in lieu of crest, there is a small alternating current motor of peculiar construction that makes about 600 revolutions per minute (Fig. 3). At every revolution a uniform vibration is propagated to the metallic plates, and is transmitted to the cranium that they embrace. The cranial walls thus vibrate in their *ensemble*, and the vibrations are naturally transmitted to the entire cerebral apparatus. The sensation is not disagreeable. The number and intensity of the vibrations, moreover, may be varied according to the tolerance of the subject. In a few minutes a sort of general lassitude is experienced, with a tendency to sleep.

The vibrating helmet has already been applied to a large number of neurasthenic invalids, the majority of whom have experienced good results from it. The process succeeds also against hemicrania, and as this is quite a common affection for which no surely efficacious remedy is known, the helmet will, in a short time, be seen to come into vogue.—*La Nature.*

Tomato Diseases.

Tomato plants have been troubled with fungi this season, and consumers are complaining of the high price and poor quality of the fruit. In some localities the young plants were destroyed or much weakened by the bacterial disease known as the Southern tomato blight. This has been followed by the old leaf enemy, Cladosporium fulvum, which produces a light brown, almost olive, mould upon the under side of the foliage. Plants with much of this fungus usually bear inferior fruit, and frequently the same enemy appears upon the fruit while it is green and less than half grown; the blossom end turns brown and decay sets in.

The newest enemy, and one of no small importance, is an anthracnose, Colletotrichum Lycopersici, which was first observed by Professor Chester, at the Delaware Experiment Station, last season, and described by him in the *Torrey Bulletin* for last December. This fungus produces sunken spots in the fruit, which become soft and dark. It quickly destroys the tomato, and for this reason and by its peculiar appearance it is usually recognized as different from any other known tomato rot. Several times my attention has been called to the ravages of this parasite by growers who observed that it was a new enemy.

The same fungus is to be found upon the foliage, when it causes brown, irregular spots. At this time, when the fruit is well advanced and frosts are expected daily, there is little or nothing to be done, except to see that the vines are finally gathered and burned. There is no question about the contagiousness of the anthracnose. The spores are numerous, and should be destroyed at the close of the season, if not before.—*Byron D. Halsted, Garden and Forest.*