

be collected by him from the defendant, if successful. If unsuccessful, or if they cannot be collected from the defendant, all those who have made themselves plaintiffs shall be required to contribute their equal proportion of such costs. The costs of taking testimony shall be paid, in the first instance, by the party for whom the testimony is taken, and be collectable finally from the unsuccessful party, and be apportioned in proper cases among all the plaintiffs. Any case of this kind may be taken to the Supreme Court of the United States by either party, on appeal, at any time within one year from the final decision in the circuit court, in the manner as the Supreme Court shall prescribe. If the decision in the circuit court is not appealed from, as above provided, it shall be final; and such decision, or the decision of the Supreme Court, annulling or confirming such patent, shall be forever conclusive as to the validity of the patent.

SEC. 19. And be it further enacted, That the salary of the Commissioner of Patents, shall be the sum of—dollars per annum, and the salary of the chief clerk shall be the same as that of a principal examiner.

SEC. 20. And be it further enacted, That the Commissioner of Patents be, and he is hereby authorized to contract, for a term not exceeding four years, for a sufficient number of copies of the descriptions, specifications, and drawings of the current patents, as they are ordered to issue, as will supply the office for all purpose of reference, and for certified copies which are now by law furnished by the Patent Office and for distribution, not exceeding four thousand copies of each patent: Provided the entire cost thereof shall not exceed five cents per copy.

SEC. 21. And be it further enacted, That the Commissioner of Patents shall distribute to each and every district court of the United States a copy of each letters patent, upon which the seal of the Patent Office shall be impressed, which shall be held to be competent evidence of the subject-matter of said letters patent in all cases in which the original letters patent could be evidence; and certified copies of any patent shall be furnished to any applicant therefor, on the same terms as the written copies are now furnished, and have the same effect in law as written copies, as provided in the fourth section of the act entitled "an act to promote the progress of the useful arts, and to repeal all acts and parts of acts heretofore made for that purpose," approved fourth July, eighteen hundred and thirty-six.

SEC. 22. And be it further enacted, That all the copies of the record herein provided for shall be executed in the Patent Office by contract, under the direction and supervision of the Commissioner of Patents, and no official original paper shall be taken from the office for that purpose.

SEC. 23. And be it further enacted, That any person who may have contrived and constructed any form for a casting which will require a new mould, matrix, or pattern, or any form for an article of manufacture or commodity, which may itself be used as such matrix, mould, or pattern for a casting, or which may in any other manner be copied from in such a way that the copyist can derive a direct and evident advantage from the labor, skill, or ingenuity of the maker or contriver, may, by having the same registered in the manner hereinafter provided, obtain a registry patent therefor. Application for such patent must be made to the commissioner in the usual way. The oath must state that the applicant himself, or by his agent, did devise and construct the article or commodity which is the subject of the patent he is seeking; and all the other regulations and provisions which now apply to the obtaining or protection of patents for inventions shall apply to applications under this section, as far as in their nature they may be deemed applicable, and so far as they are not inconsistent with the provisions of this act.

SEC. 24. And be it further enacted, That no suit shall be brought for the infringement of any registry patent unless the word "registered," with the date of such registry, be conspicuously cast upon or attached to the article

so registered, and all copies thereof made by the patentee or his assignee. And no person shall be held to have infringed such patent unless he shall have used the article registered as a mould, matrix, or pattern by means of which to manufacture a like article, or unless in some other way he shall have derived a sensible advantage to himself by copying from the article so registered or some portion thereof.

SEC. 25. And be it further enacted, That the Commissioner of Patents is hereby authorized to cause the drawings of all patents issued during the present and each succeeding year, or so much thereof as will show the exact point of invention in each case, to be suitably engraved, so that plates thereof may be prepared in season to accompany his annual report for the year on which such patent was issued: Provided, Such engraved plates shall not exceed in cost the sum of three dollars for each drawing so engraved, the expense to be paid out of the patent fund.

SEC. 26. And be it further enacted, That the circuit courts of the United States, in their respective districts, shall have jurisdiction in equity upon the application of any party holding letters patent of the United States for any new and useful art, machine, manufacture, or composition of matter, or having any sectional interest therein, to issue injunctions, both temporary and final, to restrain and prevent the importation and sale of any article or articles the product of the same or substantially the same art, machine, manufacture, or process of compounding matter, made in any foreign territory adjoining or near to the United States, and introduced into the United States for the purpose of traffic: Provided, That before any such injunction shall be granted the complainant shall offer in evidence satisfactory to the court that such article or articles was or were made by an art, machine, or process of manufacture, or of compounding matter, which, if used or exercised within the United States, would be in contemplation of law an infringement of the letters patent under which he claims. And upon a proper bill filed for the purpose aforesaid the said courts shall proceed in all respects according to the rules and principles which govern the said courts in granting injunctions to restrain and prevent infringements of letters patent in other cases, and shall grant appeals from all final decrees rendered therein, in like manner as appeals are now required by law to be granted in other suits in equity to restrain and prevent infringements of letters patent.

SEC. 27. And be it further enacted, That if, upon the final hearing of any bill filed as aforesaid, it shall appear to the satisfaction of the court that the respondent has in his or her possession any article or articles which, upon the principles of the foregoing provision, are liable to an injunction for the purposes of traffic, the court in its final decree shall adjudge the same to be forfeited to the use of the complainant.

SEC. 28. And be it further enacted, That in all suits in equity hereafter brought to restrain and prevent the infringement of letters patent, whether under this or any former act, it shall be competent to the court having jurisdiction of the cause to inquire into the damages sustained by the complainant, either by a reference to a master, or by directing an issue to a jury, as the circumstances of the case may require, and to award the same to the complainant in the final decree, and therein to treble the amount of such damages so ascertained in like manner as the courts are now authorized to treble the amount of damages found by a jury in actions at law. And the court shall have like jurisdiction in equity, to inquire into and decree the damages sustained by the complainant in consequence of a past infringement where letters patent have expired, as in cases where the bill seeks for an injunction to restrain the infringement of letters patent which have not expired.

SEC. 29. And be it further enacted, That no person who is the actual inventor of any patentable subject, and who is the first to perfect and make that invention public, or who is the first to apply for a patent therefor, shall be defeated in his endeavors to obtain a patent, or to enjoy the benefits thereof, by reason of a

previous invention of the same thing by another person, unless such previous inventor had used due diligence in perfecting his invention, and when so perfected, had, without unreasonable delay, applied for a patent therefor, or brought the invention into public use.

SEC. 30. And be it further enacted, That all acts, and parts of acts, heretofore passed, which are inconsistent with the provisions of this act, be, and the same are hereby, repealed.

(For the Scientific American.)

Meteorological Calculations.

A Table of Meteorological Calculations made for the months of July, August, and September, 1854, showing the time of passage of atmospheric influences, and also their average velocity of movement in miles per day; continued from page 240 of your present volume:

Time of passage.	Velocity of movement.	Classification of influence.
July 2, 4 A. M.	1018	4
3, 12 M.	931	6
12, 2 A. M.	795	4
18, 2 "	943	7
19, 5 "	1016	4
22, 3 P. M.	850	3
Aug. 2, 2 "	813	4
5, 7 A. M.	990	2
5, 8 "	1020	1
12, 6 "	845	2
22, 5 P. M.	996	4
22, 8 "	987	7
23, 11 "	830	1
Sept. 3, 3 "	769	5
9, 1 A. M.	1010	4
9, 3 P. M.	930	1
13, 10 "	834	4
25, 8 "	1014	2
27, 11 A. M.	698	7
28, 9 "	920	4

REMARKS.—In the classification of influences, No. 1 is of the greatest power. The calculations are made for lat. 40°, long. 6° West from Washington. The average velocity of the movement of the influences for the three months ending September 30, will be about 910 miles a day—being 46 miles more than the general average (864),—54 miles above that of the first quarter of the year, and 18 miles over the general average of the second quarter.

The condition of the atmosphere requisite for the condensation of vapor is established by the passage of atmospheric influences, and this condition depends upon atmospheric ascension. Whatever may first induce expansion of air, or give it an ascending tendency, we know that air, when once expanding, ascends, and in ascending a portion of its vapor is condensed,—in this condensation, though limited at first, latent heat is set free, together with invisible light and electricity. As the ascending current increases by the action of these liberated properties of air and vapor, the extent to which it may be carried terminates in the devastating tornado.

There are three modes of electrical discharge—the convective, luminative, and disruptive. The convective, in which the fluid tends to an equilibrium by being carried on intervening particles of matter. The luminative, in which it passes through a conducting medium by moving from one particle of matter to another, and the disruptive in which a current breaks through a non-conducting medium, and restores, instantly, the equilibrium. The convective discharge is never attended with the manifestations of light—the continual glow accompanying the luminative discharge, and the lightning flash, or spark of the disruptive, are referable to that property of matter which, when in motion, is termed light.

The convective discharge is common in winter—in mild and moist temperatures, and in ascending currents of air. The innumerable causes of the various disturbances in the electrical equilibrium require the convective mode of discharge to be constantly taking place around us: every physical action, whether animal, vegetable, or chemical, calls it into operation.

Sometimes, and especially in storms and tor-

nadoes, the convective discharge facilitates the movement of the ascending current caused partly by solar heat, and the evolution of latent caloric; for as the electricity accumulates in a region of air, either by convection or by being liberated in the process of condensation, there are negative regions around and above, that receive the excess when the electrical tension is sufficiently excited to induce the disruptive discharge. Thus, from one region of air to another, and from cloud to cloud, the fluid disseminates in its neutralization. When continually passing, in this way, from its place of liberation, there can be no check or subsidence to the ascending current; but in tornadoes, when the electricity carried up by convection, and that liberated by condensation, accumulates so rapidly, and in such quantities, that it cannot pass off above, it necessarily must return to the earth.

The alternate violence and subsidence known to characterize tornadoes, depend upon the electric fluid being alternately carried up or set free, and then returned to the earth by the luminative or disruptive discharge, which not only restores, instantly, the electrical balance, but leaves the further continuance of the storm for the next instant depending on the action of the continued evolution of latent caloric.

To the luminative discharge belongs the phenomena of the Aurora Borealis, Storm Lights, and the alternate light of the tornado; all of which are similar to the phenomena of the disruptive discharge, but on a diminutive scale. In the luminative discharge, the congregated objects of neutralization are comparatively in contact with the objects of the disruptive discharge proper. In the first, the fluid in passing from one particle of matter to another is accompanied by light made manifest by motion. Thus by a continued transfer of electricity from innumerable particles of matter to others, the fluid passes through space, keeping up a continual glow of light by the repetition of a similar action. In the second, or disruptive discharge, the flash is vastly more magnificent, and the objects connected in equilibrium are more remote.

If electricity is not liberated in ascending currents of air there could not, possibly, be so much returned to the earth by the disruptive discharge, as is known to be in storms; for during the prevalence of a storm, or tornado, the source of supply would depend on the earth only, and the negative condition of the upper strata of air required to take it up, would not, under any circumstance, permit its return.—Therefore, the assertion that electricity is liberated in the condensation of vapor, in the same manner and by laws similar to those by which caloric is set free, and that the disruptive discharge in tornadoes near the surface of the earth, always passes from the cloud to the earth, is founded on fact, and in harmony with every known law of physics. J. HALL.

Athens, Ill., June 24, 1854.

Improved Fire Arms.

Among the more recent applications for patents there is one by Joseph C. Day, of Hackettstown, N. J., setting forth certain improvements in fire arms as suggested to his mind. The connections between the breech and barrel of the gun which he proposes to construct, are made in about the usual mode, as also the appliances for loading and the supplying of caps. But he has arranged a spring at the mouth of the cap tube, whereby the caps are severally held in position, as delivered from the feeding tube, until the hammer strikes them down upon the nipple.

Soldering Salt.

CHLORIDE OF ZINC AND AMMONIUM.—Vessels may be tinned with this salt without previously cleansing their surfaces. It is made by dissolving 1 lb. zinc in muriatic acid, adding 22 ozs. salammoniac to the solution, and evaporating to dryness; the yield is 2½ lbs. of the double salt. To use it, the salt, moistened with water, is brushed on the surface to be tinned, a little solder laid on it here and there, and the surface heated until the solder fuses, when it flows wherever the salt was put, and unites with the metallic surface.