

opportunity of fortifying their original patent rights by securing design patents upon any improved patterns or forms used in the production of any portion of their improved goods.

In order to give our readers an idea of the broad and far-reaching nature of the design patent law, as interpreted by the present able and liberal minded Commissioner, we will here quote the language of the statute itself:

"Any person who, by his own industry, genius, efforts, and expense, has invented and produced any new and original design for a manufacture, bust, statue, alto relieve, or bass-relief; any new and original design for the printing of woolen, silk, cotton, or other fabrics; any new and original impression, ornament, patent (pattern), print, or picture to be printed, painted, cast, or otherwise placed on or worked into any article of manufacture; or any new, useful, and original shape or configuration of any article of manufacture, the same not having been known or used by others before his invention or production thereof, or patented or described in any printed publication, may, upon payment of the fee prescribed, and other due proceedings had the same as in cases of inventions or discoveries, obtain a patent therefor.

"The Commissioner may dispense with models of designs when the design can be sufficiently represented by drawings or photographs.

"Patents for designs may be granted for the term of three years and six months, or for seven years, or for fourteen years, as the applicant may, in his application, elect."

THE NOVEMBER METEORS.

On the 12th, 13th, and 14th of November, the earth plows her way through a swarm of meteoroids known as the November meteor-zone. There is no reason to anticipate any special display at the present passage, but everything relating to comets, meteors, and the curious connection existing between them is now specially attractive on account of the interest aroused by the visit of the great comet.

The November meteor-zone is made up of a swarm of meteoroids revolving around the sun in an orbit of great eccentricity, the perihelion resting on the earth's orbit, and the aphelion extending beyond the orbit of Uranus. The earth passes through the portion resting on her orbit every year about the 13th of November. The immense width of the zone may be inferred from the fact that the earth, moving eighteen miles in a second, is three days in passing through it. The meteoroids are not equally scattered around the orbit, the thickest portion extending along about one-fifteenth of the space. The earth meets the thickest portion of the swarm once in thirty-three years and a quarter, and the event is signalized by a dazzling display of shooting stars that ranks among the most awe-inspiring and beautiful celestial phenomena on record. At other times, the earth encounters a portion of the zone either almost destitute of meteors, or where they are sparsely scattered. There cannot be a grand meteoric shower unless the earth and the swarm of meteors cross at the same time.

The November meteoric showers thus took place with a few straggling falling stars annually, and a great display occasionally, and no one was able for many centuries to find out the secret of their action. But busy brains were at work, and keen eyes were watching the ways of the cosmical atoms. At length it was proved that the period of revolution was thirty-three and a quarter years, and more wonderful still, it was discovered that a faint telescopic comet, known as Tempel's comet, was moving in the same orbit as the meteors were. Astronomers seized the key and worked out the problem.

It is now clear as day that the November meteors are caused by the earth's encountering a swarm of particles following Tempel's comet in its orbit, and completing the circuit in thirty-three and a quarter years. The comet's tail is actually splitting into meteors that thus far fill but one-fifteenth of the zone, but will in time be scattered through its whole extent as has already taken place in the August meteors, a much older system connected with a comet in the same way.

It is therefore easy to see that once in about thirty-three years the earth and the tail of Tempel's comet will meet on the celestial road, and the result will be a rain of fire, shooting stars falling like snow. Many observers now living will remember the superb meteoric showers of 1833, and 1866-67. By consulting astronomical annals, these showers have been traced back for a thousand years. The next one may be expected in 1899, and is eagerly anticipated among coming celestial events.

The recent origin of the November meteors is proved from the fact that the thickest portion of the swarm at present extends over a comparatively small part of the zone. Leverrier, a famous French astronomer, gave an ingenious theory to account for the introduction of the meteoric ring into the system, and calculated the time when the event occurred. The four giant planets exert a powerful attraction upon the comets that come near them. Jupiter is especially distinguished in this line, and is called the great comet disturber for this reason. The theory is that about the year 126 of the Christian era, Tempel's comet passed near Uranus. The planet's attraction changed the comet's orbit into an ellipse, revolving about the sun in the track we have already described. Ever since it has continued to revolve in its new orbit, its tail all the while breaking into meteors which finally will fill the whole zone. Therefore we must wait till 1899 for a rain of shooting stars on a grand

scale. Meantime we must be contented with the few stragglers that in the passage of the earth through the zone in the present month will impinge against our atmosphere, and being ignited by the concussion, trail their shining way through the heavens.

The radiant point of the November meteors is in the constellation Leo. The most favorable time for observation is about 3 o'clock in the morning, for the starry group is then well up in the east, and the tiny visitors may be seen to the best advantage.

Comets and meteors are now among the most interesting objects of astronomical research, for they are closely associated if not identical. It is not improbable that their fall upon the sun in numbers of which we can form no conception, instead of being a cause of alarm, may serve as fuel to keep up his fires, and thus prolong his power of giving life and heat to the earth.

MAGNESO-CALCITE FOR SAFE LININGS.

A public exhibition of the fire-resisting qualities of magnesio-calcite, a new lining for safes, bank vaults, warehouse shutters, express chests, jewelry cases, and the like, was given in this city, October 29, under the direction of Mr. William Hoey, of Adams Express Company.

Three boxes lined with magnesio-calcite were subjected to a severe fire test. The larger was an iron chest, of the sort used by express companies in transporting valuables. Books, bank notes, cigars, and other combustibles inclosed in the chest were found uninjured after three hours' exposure of the chest to intense heat. The two smaller boxes of sheet iron, and with one inch lining, were an hour in the fire. When withdrawn and cooled their contents were found intact and free from stain or any other sign of exposure to heat.

The fireproof lining is composed of sheets of asbestos paper and paper board charged with a heat-resisting composition. The lining is tough and elastic, and is calculated to add strength to the walls of the boxes or safes in which it is used.

There would seem to be a wide field of utility for the new composition, in the construction of fireproof partitions, floors, and roofs, as well as for doors, windows, shutters, and safes, its lamellar structure giving it many advantages.

CHARLES DESNOS.

Many readers of the SCIENTIFIC AMERICAN will learn with much sorrow of the death of Mr. Chas. Desnos, the well-known civil engineer and patent solicitor in Paris.

The extensive offices of Mr. Desnos on Boulevard Magenta were frequented by inventors and scientific men from all countries, and many of our American patentees will recollect with satisfaction the cordial manner they were received by the genial engineer now dead, and how ready he ever was to render them counsel in matters pertaining to their patents and practical advice as to the best means of introducing their inventions into France. Mr. Desnos had been in poor health for several weeks, but his recovery was not despaired of till he was stricken with apoplexy on the 15th of October, which terminated his life. Mr. Desnos's loss is not to his family and intimate friends alone, but in scientific circles and by inventors whose friend he was.

Importance of Cleaning Machinery.

In a recent article of a Continental journal devoted to the art of watchmaking, the necessity was demonstrated of having a watch regularly cleaned, at least every two years, in order not only to insure its regularity of action, but also to preserve it in good condition, and to prevent its being unduly worn out. It was specially pointed out that the balance of an ordinary watch revolved at a rate which would perform a journey round the world in four and a half years (the calculation was demonstrated by figures which, however, cannot interest us here), and it was pointed out that during this traverse the action of the watch in all its parts was constant, and never was allowed to rest for a single second; no bearings were given time to cool, and no parts taken out and readjusted, and that in this manner a watch was required to work well under circumstances which are not expected from any other machine extant. These observations struck us, says the *Textile Manufacturer*, as peculiarly pertinent with respect to textile machinery, which, of all other, is perhaps that which comes nearest a watch in its complexity, and runs regularly at the highest speeds.

We once heard it stated, though we never examined the assertion, that the shuttle in an ordinary calico loom runs at the rate of ten miles per hour—a speed which would carry it round the world in six months. A ring spindle, running at the rate of 7,000 revolutions per minute, goes much faster; both have moments of rest during the day, and enjoy repose for about twelve hours at night, but while they are at work they certainly are not idle. Now, it must stand to reason that any part of a machine, being in constant motion at such a high speed, must be subjected to a great deal of wear and tear unless the friction be reduced to a minimum by perfect lubrication and great cleanliness, both matters which in many places leave much to be desired.

We have sometimes heard comparisons made between this or that spindle, or the metal of this or that bush, to the detriment of those supplied by one maker or another, when in reality the fault lay only in the greater attention paid to cleanliness and good oil in one mill over another. It would hardly be believed, the *Manufacturer* further adds, if we

stated the condition in which the machinery in some mills is kept; it is lubricated (?) by any cheap compound which rejoices in the name of oil; dust and dirt are allowed to fly about in the air and to settle on the machinery, and all cleaning is done superficially, so as only to satisfy the general appearance, while a thorough cleaning of those parts which do most of the work, and are generally out of sight, is neglected. That such mills cannot come up to the speed of others, and if they attempt to do it have soon the principal machines worn out and shaky, is then not to be wondered at. There are, however, other mills in which things are differently managed, where the utmost cleanliness is to be observed everywhere, where generally one machine of a kind is over and above the required number, and thus there is always one which is periodically thoroughly overhauled, all bearings examined, any worn ones repaired or renewed, all parts thoroughly cleansed and adjusted, and thus the whole machine kept as near perfection as possible. Such machinery will then also run smoother, easier, and faster than the neglected ones, and do this for a number of years. Let any one who wishes to have a clear idea of this attend a few sales by auction, where he would have leisure to examine the machines; many of these nowadays have the date of their production cast on; he will thus often find that machines which have been in constant use for ten and fifteen years are in a better condition than others which have only run half that time.

We could say much about the quality of the oil to be used, the best speed of the machines, a good foundation, perfectly level position, or a steady turning, but these considerations would carry us too far for the present. What we wish to point out here is only the necessity of cleanliness, and a periodical overhauling of the machines in any mill, be it spinning or weaving, and to show millowners that, if they wish to do the most with them, they must keep them constantly as near perfection as it is possible to do. If it costs a little extra money, if the acquisition of an additional machine absorbs a little capital, this will soon be repaid by the saving in the condition of the machinery, and a better, as well as greater production.

Tile Fish.

Speaking of the disappearance of tile fish from waters in which they were so plentiful a year ago, Professor Baird, Chief of the U. S. Fish Commission, said, recently:

"These fish belong to the western edge of the Gulf Stream and inhabit the water lying about seventy-five to one hundred and twenty fathoms below the surface. Last year they were seen in such abundance that our men could have taken twenty-thousand pounds if necessary. Suddenly in the spring they began to come to the surface alive, give a convulsive struggle, and then lay on their backs dead. They are now extinct for ten thousand square miles. They can have been killed by three known agencies—heat, cold, or gaseous exhalations. The first is improbable, and no gases can well have been liberated without an earthquake, which would have been accompanied by a tidal wave on shore. There were during last winter a large number of icebergs liberated from the Arctic regions. The cold water from these would naturally descend and probably formed a sub-current at the swimming level of the tile-fish. Those to the south of the section we visited have, no doubt, escaped and will be discovered in due time."

While cruising south of No-Man's Land and Martha's Vineyard this year, Professor Baird's steamer passed through ten miles of menhaden or moss-bunkers, a fish which was supposed to have disappeared. Professor Baird also alluded to the fact that, in the Gulf of Mexico, hundreds of tons of fish are sometimes killed by the "northers." He therefore thinks there is reason to hope that the tile fish may reappear in its old haunts.

The Sleeping Car Interests.

The Chicago, Milwaukee, and St. Paul Railway Company has recently made with the Pullman Palace Car Company a contract whereby the latter assumes control of the sleeping car service of that road and its associates, having a total length of 4,500 miles. This gives the latter company a continuous service from the Atlantic to the Rocky Mountains, with a prospect of speedy extension to Oregon and California. Speaking of the change the *Railway Age* says that the sleeping car companies are now reduced to three—the Pullman with about 900 cars, the Wagner with 250, and the Woodruff with about 70. A few companies run their own sleepers—among them at present the Baltimore and Ohio, St. Paul, Minneapolis and Manitoba, and Central Pacific. On the other hand, several companies have tried the experiment and abandoned it—among them the Chicago, Rock Island and Pacific, after about twenty years of independent operation, the Northern Pacific, soon to be one of the great transcontinental lines, and the Illinois Central, for its through service. It is not unlikely that others of the great lines now running their own sleepers will soon follow the course of those last named.

Coal Product of Illinois.

The State Bureau of Labor shows that Illinois ranks next to Pennsylvania in the production of coal. The output for 1882 was 9,000,000 tons. Last year the yield was 6,000,000 tons. The coal mines are found in forty-six of the hundred counties of the State. The value of the year's yield of coal at the mines was nearly \$14,000,000.