

**Electrical Patents in the United States.**

The subject of patents has always been an interesting one in the United States, but it seems to be on the increase even now.

During the year 1881 nearly 16,000 patents were granted in the United States, a larger number than was ever granted before in this or any other country.

This would seem to indicate increased inducements to special inventors in certain lines of invention, were it not for the fact that a careful study of their special classifications adopted by this Patent Office shows no marked increase in any particular class, with one single exception, viz., electricity.

In that class there has been remarkable energy displayed, and the Commissioner has found it necessary to divide the classification within the year by transferring to other divisions of the examining corps such details as could be properly spared and yet not materially affect the class proper.

The division of electricity has grown to be the largest in the Patent Office, with an average monthly showing of over two hundred new applications.

It has been the practice in the Patent Office to observe with the greatest strictness a proper classification, and to this end only such details as gas lighting devices, electrical registers, conductors, insulators, and, in short, those devices not purely electrical in their nature, have been lopped off. There are now employed in the electrical division one principal examiner, seven assistants, and three clerks, a larger force than in any other division in the office, and yet it has been found necessary to make the transfers above noted in order that the work might be kept up. On the above force there devolves the duty of examination as to novelty, utility, operativeness, etc., and oftentimes careful and accurate experiments are made to prove the assertions alleged in descriptions of inventions.

By order of Commissioner Marble, of the Patent Office, all United States patents appertaining to or bearing upon electricity granted prior to July 1, 1881, have been reprinted and the drawings thereof reproduced and bound up in neat substantial quarto volumes of about two thousand pages each. There are sixteen such volumes, the subject matter of each being of such sub-classes as naturally relate to each other, thus giving in each volume a full *resume* of the state of the art from its origin to date. There were issued to, and including, the above date, 3,825 such patents, which are subdivided into sixty-nine sub-classes.

The following table shows the number of each particular kind of patent which relates directly to the telegraph, to wit:

Telegraphs .....	46
" (automatic) .....	111
" (dial) .....	23
" (duplex) .....	61
" (dynamo) .....	8
" (multiplex) .....	7
" (perforating) .....	26
" (printing) .....	191
" (quadriplex) .....	19
Circuit-closers .....	31
Condensers .....	5
Electro-magnets .....	42
Keys .....	42
Lightning arresters .....	8
Morse registers .....	20
Relays and sounders .....	111
Conductors .....	149
Insulators .....	107

In duplex and multiplex telegraphy there has been but little advance, but there are pending applications for patents for several valuable inventions.

In telegraphs and telegraph apparatus but slight advance is apparent, the leading inventions being in the applications of dynamo instead of batteries for telegraphic purposes.

There is also much interest manifested in relation to the Faure secondary battery, and applications are pouring in upon that subject, but as yet nothing appears to be any advance upon what Faure has done. There is, however, as much interest developed in dynamo machines, and there are at present pending over one hundred and fifty applications.

The telephone occupies the minds of would-be patentees to a wonderful extent. The first telephonic telegraph patents were granted in 1875, and before January 1, 1878, they numbered less than two dozen. Now they constitute in all eight sub-divisions, embracing all kinds of telephones, telephone telegraphs, alarms, calls, appliances, etc., all told 438 patents.

A large interest is also apparent in telephones and telephone exchange systems, and there are pending over two hundred applications on these devices.

Some idea may be formed about the interest manifested in America as to the future of the electric light when it appears that there are now pending over three hundred applications for patents on various features thereof, a large majority of such applications being for what is known as incandescent patterns and their appliances.

Taking the subject of electrical patents as a whole the most activity has been exercised within the following during the past three years: 1, electric lights; 2, dynamo machines; 3, telephones and their appliances. Prior to January 1, 1878, there were only 20 patents on electric lights; July 1, 1881, there were 192. Prior to July 1, 1879, there were only 19 dynamo and magneto machines; July 1, 1881, shows 111.

Where there are so many minds brought to bear upon kindred subjects it is not strange that many should invent the same thing, or take the same method of obtaining similar results in scientific experiments and investigations. This is

found in the examining department of the Patent Office to often be the case with electrical appliances. Old patents are innocently re-invented and several persons frequently invent the same thing. This is mainly because they are prescribed by the immutable laws of science that must be always obeyed under certain given relations. Some of the wonders of electricity applied by Franklin in his investigations would be thought new and astonishing if shown for the first time at this day. In 1748, at a picnic, he "killed a turkey by the electric spark, and roasted it by an electric jack before a fire kindled by the electric bottle."

The practical storage of electricity was long ago proved by Franklin's "bottled lightning." If many of the inventions now prove to be of no immediate practical use or advantage they may yet lead to something in the future that will be of constant use and great benefit to the world. This has always been remarkably true of electricity, more than of any other department of science or mechanics.—*Journal of the Telegraph.*

**How Paper Car Wheels are Made.**

The Allen Paper Car Wheel Works are located at what is now the northern extremity of Pullman, Ill., though the Union Foundry and Car Wheel Company is building a large foundry and dwelling houses about half a mile north of this point, which will doubtless become a part of Pullman at an early day. The buildings of the Allen Company are two parallel structures, extending 370 feet north and south by 150 feet, connected in the center by an annex. The rear building is used for a foundry, and in the front building the paper car wheels are made and fitted into their casings. On the second story are the offices of the company. Above the center floats a flag bearing the words, "The Allen Paper Car Wheel Company."

The *Western Paper Trade* says: Entering the office, the visitor is conducted to the point on the first floor where the straw board is received, at present at the rate of about a carload a week. It is the ordinary straw board of commerce, which until recently had been purchased at the Rockton Mills, in this State, but is now made at the Allen Company's mill at Morris, Ill., where it is cut by machinery into circular disks, with a hole in the center for the hub of the wheel. These disks are a little larger than the sizes required for the wheels, which are 26, 33, and 42 inches. Three of these disks are fastened together with ordinary flour paste, applied by hand with a brush, and the triple sheets are piled together to the thickness of three or four feet. Then the mass is placed in a hydraulic press and subjected to a pressure of about 650 tons for three hours. When removed from the press each three sheets is found incorporated into a single solid board. These boards are sent up-stairs to the heating room and subjected to a temperature of 120° Fah. for two weeks, or until every drop of moisture has been extracted. They are then sent down stairs and pressed again to straighten them, and pasted together, dried and pressed again and again, until they are of the thickness required for the wheels, having to undergo hydraulic pressure three times, and to remain in the drying and seasoning rooms some six weeks, or even more.

When the paper material for the wheels is prepared, it varies from four to five inches in thickness, according to the size of the wheel, and is as solid as the hardest wood. One hundred and seventeen sheets of ordinary straw board contribute to the paper structure of a 42 inch wheel, and one hundred sheets to a 26 inch wheel. After being thoroughly dried the paper block is carried to the trimming room and placed upon a lathe, the tender of which is given a steel tire to which the block is to be fitted, and it is turned to the required size, which is always a little larger than the interior of the tire that is to cover the edges of the paper. Then the block is handed over to the painter, who treats it to two coats, consuming about a quarter of a pound of brown mineral paint, and it is then ready to be fitted into the tire. It is again removed to the ground floor, and forced into the tire by hydraulic pressure, applied at the rate of 3,000 pounds to the square inch, so that the paper block fits as closely as possible into the rim of the wheel, the whole structure forming a very compact mass. The hub is then forced into its place, and heavy iron plates fastened upon either side of the wheel by strong bolts extending through it. The wheel is then ready for use. A 42 inch wheel will weigh about 1,115 pounds, divided as follows: Paper, 185 pounds; tire, 560 pounds; side plates, 140 pounds; hub, 200 pounds; bolts, 50 pounds. The tires are of the best German steel, made at the Krupp Works in Prussia; the wrought iron plates, hubs, and bolts are of American material, the castings being made at Pullman. American tires are not used, it is stated, because they are not yet made in sufficient numbers to supply the demand.

About eighty men are now employed in the Allen Works here, and the company have a factory of about the same capacity at Hudson, N. Y. More men will be required here, however, when the new machinery, now making, is completed. At present twenty-four to twenty-six wheels a day are made, but it is expected to increase this number 25 per cent within a short time. The cost of a 33 inch paper wheel is about \$80, and of an iron wheel of the same size not far from \$15, but it is claimed that the paper wheel will outlast and outwear the iron wheel to an extent that renders the former a decided economy. A distance of 100,000 miles is about the maximum service to be obtained from axles with iron wheels, while on various roads the axles used with paper wheels have averaged over 400,000 miles each. This differ-

ence is accounted for on the ground that the paper centers intercept or absorb all vibration occasioned by contact between the tire and the rail, while with iron wheels this vibration is submitted to the axle, thereby causing a more rapid wearing of the journal, and the disintegrating of the axle.

The paper wheel is practically indestructible, and can be used indefinitely. When the steel tire wears out a new tire can be placed over the paper, and when a breakage occurs these wheels are sent back to Pullman to be repaired. The danger from accidents by their use is said to be reduced to a minimum. The Pullman Palace Car Company have used the paper wheels for about ten years, and according to Mr. A. B. Pullman's statement, "have never had an accident caused through broken wheels or axles with any cars having paper wheels under them. While the present style of wheel has been in service we never had a paper wheel fail *en route*." This is another tribute to paper as an element to civilization. The man would have been considered a "crank" who, fifteen years ago, had predicted that paper car wheels would outwear and be safer than iron wheels. The first paper car wheels were made by Richard Norton Allen, in Brandon, Vt., in 1869, and these wheels were first used on a Pullman sleeping car in 1871.

**RECENT INVENTIONS.**

An improved horseshoe has been patented by Mr. James B. Finch, of Bozeman, Montana Ter. The object of this invention is to relieve the feet of horses from the jar or shock of traveling on hard or paved roads, and also to provide for removal of the calks from the shoe. The invention consists in a flanged calk and rubber block combined with a recessed shoe.

A cheap, efficient, and easily removable shoe for protecting the feet of fat cattle and oxen while being worked or driven long distances upon the road, has been patented by Mr. John M. Goodman, of Mill Creek, Pa. This invention consists principally of two right and left ground shoes or plates, upon which the foot of the animal rests, each plate being provided with upwardly projecting side flanges or fenders, which are inwardly inclined and curved to fit the sides of the hoof, the two parts of the shoe being adapted to be secured upon the foot in any suitable manner.

Mr. David F. Goodyear, of Memphis, Tenn., has patented a can, box, or receptacle for grocers, druggists, and family use, for holding dry comminuted substances, from which small quantities can be conveniently taken without exposing the contents of the can, box, or receptacle to the air, or taking the can or receptacle from the shelf, or removing it from the position in which it is placed. This invention consists principally of a can having a lower or bottom compartment, with a removable sliding scoop, the main compartment of the can being provided with a hopper-shaped bottom opening immediately above the scoop, and adapted to be opened and closed by a slide operated from the outside of the can.

A corroding house for the manufacture of white lead by the old Dutch process has been patented by Mr. William H. Wetherill, of Philadelphia, Pa. These improvements relate to the buildings or houses used in the production of lead carbonates by the old Dutch process of corrosion. These houses have been constructed of wood, and are expensive both in first cost and in maintenance on account of their rapid decay. The invention consists in a permanent structure of stone or brick constructed to facilitate the process.

Mr. Edwin E. Glaskin, of Lower Cape, New Brunswick, Canada, has patented an improvement in the class of fire kindling blocks containing sawdust, resin, and tallow, or some other oleaginous substance. Such blocks have had two prominent defects, which have greatly impaired their utility—that is to say, they have been either too soft, so as to soon lose their form and adhere together, or too brittle and friable, so that they would not retain their shape, but crumble into fragments. These results are due to lack of due proportion of the ingredients and of sufficient pressure when the blocks are being moulded. The process of producing the fire kindling blocks consists in mixing dry sawdust with resin and oil, in the proportions respectively, of five parts, one part, and one-sixteenth of one part, and then placing the mass in suitable moulds and compressing it to the degree of one thousand pounds, or thereabout, to the square inch, for the purpose of compacting it into hard non-friable blocks.

An improved stereotype-plate holder has been patented by Mr. Andrew Overend, of Philadelphia, Pa. This invention consists of a metallic stereotype block having improved means for holding the plates. A graduated gauge block is provided for fixing or determining the margins.

Messrs. William B. Padgett and Willis J. Brock, of Batesville, Ark., have patented a wagon brake, constructed so that it is applied to the vehicles automatically when the team ceases to draw, and the power of the brake can be increased and the brake locked away from the wheels at the will of the driver.

An improved process of treating hide in the manufacture of counter-stiffeners has been patented by Mr. William H. Metcalf, of Brooklyn, N. Y. The object of this invention is to render hide counters waterproof, so that they shall retain their rigidity under all circumstances. The invention consists in a process of treating the hide, which consists in saturating with a solution of benzine, paraffine, and drying oil.

An improved sap spout has been patented by Mr. George J. Record, of Conneaut, Ohio. The invention consists in the combination with the tapering tube of an eccentrically perforated ring flange, whereby additional security is obtained against the accidental detachment of the sap bucket.