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EXTENSION OF PATENTS—FOR WHOSE BENEFIT THEY ARE GRANTED.

There seems to be an impression among inventors that since the law of March 4, 1861, went into force, the previous law, in respect to extending patents for seven years, was abrogated. This is not so in regard to cases which were patented under the old law. Any patent which was granted prior to March 4, 1861, may be extended for seven years on proper application to the Patent Office, provided the patentee has not already been amply remunerated for his invention, and proves to the satisfaction of the Commissioner that he has used proper diligence in attempting to realize gains from his patent. The patentees of 1851 should lose no time in making out a statement of their profits and losses in consequence of their patents, and in seeing counsel in regard to an extension, if they wish the term of these expiring patents continued for another seven years.

It is often the case that the extended term of a patent produces to the patentee a ten-fold profit over the amount realized during the first fourteen years of its existence. The assignees of a patent cannot obtain this extension: it must be done at the instance of the inventor—or, if deceased, his heirs may apply for the extension, but in either case ninety days' notice of their intention should be given—for whose sole benefit it is granted.

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THE CITIZEN'S GREAT DUTY.

ABRAHAM LINCOLN, of Illinois, has been re-elected President of the United States by a large popular majority; and ANDREW JOHNSON, of Tennessee, has been chosen Vice President, to succeed Hannibal Hamlin, of Maine. The election passed off peaceably and without the necessity of military interference; and it now becomes citizens of all parties to yield a willing and cheerful obedience to the authorities thus constituted by the popular suffrages. Under our constitutional Government such obedience is absolutely requisite to the permanent safety and prosperity of the Republic; for unless this Government be upheld by the united strength of the people its destruction will ensue; order will give place to anarchy, and anarchy will be succeeded by a despotic power supported by military force and violence.

We have already witnessed the direful consequences of a rebellion against the rightfully-chosen leaders of the nation, the sad effects of which will exist for a generation at least. We therefore exhort our readers to put aside all partisan bitterness and yield unwavering devotion to the Government. This war would, in our judgment, come to a speedy end if citizens of every class would unite in strong determination to succeed. We have a country and a government worth saving, and it cannot be rescued from destruction by sharp partisan conflicts, such as we have now most happily passed through. We could find fault with the Administration—it has committed grievous errors; but we are forced to believe that the Chief Magistrate has endeavored to do his duty manfully and faithfully, and it is no fault of his if he has not the mental power of a Burke or a Webster. Let statesmen now forget their political aspirations and apply their wisdom to great questions affecting our civil government; let financiers busy their brains with such schemes as will best support the national exchequer. Soldiers will then stand by their arms, and, with the moral power of the nation to sustain them, will battle with and [defeat the enemy; ministers will preach "of righteousness, temperance and a judgment to come," not forgetting that "without charity we are nothing;" farmers will toil at the plow and in the harvest field; mechanics will be busy in the workshop and the manufactory, while the inventor with his keen perception of the great necessities of the Government and the people for labor-saving machinery, will tax his fertile brain to meet these necessities; and, altogether, we will join hearts and hands in lending our moral and financial support to the Government, believing that thus, and thus only, can we save the goodly heritage of our fathers.

IS GUNPOWDER LIABLE TO SPONTANEOUS COMBUSTION?

The recent terrible explosion near London has led some of the ablest of the English journals to suggest the liability of gunpowder to spontaneous combustion, and the location of large magazines in the vicinity of some of our cities makes this suggestion of great interest to us.

There are four processes by which substances are set on fire spontaneously:—1st, by the rapid absorption of oxygen from the atmosphere; 2d, by fermentation; 3d, by the development of heat in the change from the solid to the liquid state; 4th, by the condensation of gases on the surface of solids.

1st. There is a class of oils called drying oils, from the fact that when exposed to the atmosphere the oxygen of the air enters into chemical combination with them, and converts them from liquid oils to solid resins. This property adapts these oils to use as paint. When oils of this class are spread out in a way to offer a very large surface to the action of the atmosphere, the combination of oxygen with them is sometimes so rapid as to set them on fire. The largest surface of oil in proportion to the mass can be obtained by spreading it over the minute fibers of cotton, linen, or wool, and the great majority of cases of spontaneous combustion have resulted from saturating some of these fibers, either in the mass or in cloth, with linseed oil.

2d. When damp straw or manure takes fire from fermentation, the heat results in this case also from the absorption of oxygen from the atmosphere.

3d. When water is brought in contact with quick lime the two substances enter into chemical combination with each other, forming hydrate of lime. The water is changed from the liquid to the solid state, and its heat of fluidity is converted from latent to sensible heat. When the change is sufficiently rapid the heat given up will set fire to any dry wood with which the lime is in contact. Much property has been destroyed by this process of spontaneous combustion.

4th. Charcoal, in common with some other substances, has the property of attracting gases to its surface with such force that the gases are condensed, and the condensation of course develops heat. In some cases this condensation is sufficiently rapid to set the charcoal on fire.

If gunpowder ever takes fire spontaneously, it must be by the process last described; but this is in the highest degree improbable. It is only freshly burned charcoal that has the property of condensing

gases on its surface; by being wet it loses the property. As the several ingredients of gunpowder are mixed together in the form of a moist paste, the susceptibility of the charcoal in it to spontaneous combustion must be destroyed. We have never known an instance of gunpowder taking fire spontaneously and we expect never to know of one.

THE AVERY ENGINE.

We have had many inquiries in relation to this engine, and we will undertake to answer them all in one article. The Avery engine is simply Hero's engine with sword-shaped arms. Hero lived at Alexandria, in Egypt, 120 years before the Christian era, and among his numerous inventions was the first steam engine ever constructed. It was formed by connecting a tube with a steam pipe in such manner that it could revolve, and having a second tube crossing the first at right angles, with the interiors in open communication. Small holes were then made in the second tube near its ends and on opposite sides. As the pressure of the steam against the interior walls of the tubes was exerted on all parts except the holes, the pressure opposite to these holes caused the apparatus to revolve. Two thousand years afterwards an Englishman by the name of Barker attached his name to Hero's engine, and it is now generally known among the English as Barker's mill.

In order to obtain the full power of the steam from Hero's engine it is necessary that the parts where the steam escapes should move with a velocity equal to that with which the steam issues from the orifices. This high velocity causes great resistance from the air, and to diminish this resistance Mr. Avery conceived the idea of making the cross tube or arms sword-shaped. He obtained a patent for this improvement, and Hero's engine with sword-shaped arms is known in this community as the Avery engine.

Thirty years ago there was a large saw mill in Atorney street, in this city, driven by an Avery engine. The arms extended about five feet, and the engine was run about 3,000 revolutions per minute, making the velocity at the ends of the arms about equal to that of a cannon ball. As the specific gravity of steam at the atmospheric pressure is less than that of air, the resistance would be less if the engine were run in steam than if it were run in air; it was accordingly surrounded by a box with a small opening for the escape of the steam but which confined it sufficiently to exclude the air. The openings in the arms were very minute, if we remember rightly only one sixty-fourth of an inch area, and the steam was worked at a very high pressure.

In order to resist the great centrifugal force resulting from such rapid rotation the arms were made of cast steel. On one occasion a new engine was started which proved to have a flaw near the end of one of the arms; the piece came off and went up through two or three floors with a force equal to that of a cannon shot.

By long use deep furrows were worn in the edge and sides of the revolving arms, giving a jagged edge like an irregular saw. These furrows were probably first started by particles of dust, and the wearing was continued by the friction of the steam.

After this engine had been in use some twenty years it was taken out, and a cylinder engine was substituted. We have been told that the proprietors regretted the change after it was made, finding on trial that they did not like the cylinder engine as well as the old revolver.

A locomotive was constructed in this State with an Avery engine, but did not prove a success. The high velocity with which the arms revolve causes great resistance to any change, however slight, in the plane of rotation, and this unfits the Avery engine for locomotive purposes either on railways or steamboats. Every passage of a curve on the railroad, and every roll of a steamboat would change the plane in which the arms were revolving, and the resistance offered by the high velocity to this change of plane would rack the supports of the engine to pieces.

PETROLEUM.

Like all other great staples of the country this oleaginous one requires machinery to aid in bringing it to the surface and to market. Its cost of production