worthy of the public patronage. It simply declares that if it be good it shall not be stolen; but, if it be useless, nobody will want to steal it. But of all those who enter upon any occupation of life, how many succeed and how many fail? How many young men have entered the bar, and have failed to take rank with Evarts, O'Connor, or Brady? How many have launched their bark, laden with mercantile ventures, and have been stranded, while Claflin and Stewart were sailing into port? How many have been moved to "start a paper," who have lived as long, but not to as much purpose, as Raymond, Bennett, or Greeley? I suppose that nine failures to one success is a very fair proportion for the professions of the world, including that of the inventor; or, at all events, I do not suppose that the failures among inventors are more numerous than among every other class of workingmen. As to property in inventions, I shall not stop to discuss it. That a man having, by long experiment—by patient thought—by brilliant genius—by the expenditure of time and of means, conceived and brought to perfection and embodiment some new idea, having created some new substance, put in motion some new machine, put some old force to new work, or given to some new force a field for labor, is not entitled to call this which he has done his own and to set his price upon it, need not I think be argued before honest men? If we owe nothing to the men who have made this century so illustrious by their great conceptions, then we owe nothing to anybody, and repudiation ought to be the watchword of the age.

A CASH DEBT DUE INVENTORS—HOW TO REWARD THEM.

We do owe them much, not merely a debt of sentimental gratitude, but a debt payable in cash, which shall lift them above want, and place them upon such a pinnacle of happiness that the world shall say, "Thus shall it be done unto the man whom the nation delighted to honor!" How shall we give pecuniary consideration for inventions? There are two ways in which this might be done. One is by the purchase, for cash, by the Government of all inventions, for the use of the nation. This plan is met at the outset by the impossibility of determining the value. Every inventor supposes himself to have a fortune in every conception that he puts into wood and iron. Stealing tremblingly and furtively up the steps of the Patent Office, with his model carefully concealed under his coat, lest some sharper shall see it and rob him of his darling thought, he hopes to come down those steps with the precious parchment that shall insure him a present competency and that shall enrich his children. I should think if he were offered a million, in the first flush of his triumph, that he would hesitate about touching it without sleeping over it for a night. Yet fourteen thousand millions would be a pretty heavy bill to pay from a treasury not over full. Fourteen hundred millions might be thought an important addition to the national debt, or even one million four hundred thousand, which would be just $100 a piece for all the patented inventions of 1869. I think, therefore, that we may set aside the plan of purchase as impracticable.

HOW TO DEAL JUSTLY BY THE INVENTOR.

No commission could satisfy the inventor, and no price that we could afford to pay would take the place of the stimulus of the hope of unlimited wealth which now lightens his toil and shines like a beacon at the entrance of the harbor that he hopes to make. The other plan is to offer protection for a limited time, in payment for the new discovery. We may say to the inventor, "You have a valuable secret, which may benefit us. To disclose it without protection would be to lose it. To keep it would deprive us of its use. If you will disclose it to us by so describing it and illustrating it, as that we may fully understand it and may avail ourselves of it without difficulty, we will agree that for seventeen years you shall be protected in its use. You may make out of it what you can. When your limit of time has expired we shall have it without further payment. We cannot pay you in money, we will pay you in time." I submit that this is a fair bargain. A new thought developed, explained, described, illustrated, put on record for the use of the nation—this on the one side. The right to the exclusive benefit of this new thought for a limited time, and protection in that right—this on the other. This is the patent system. A fair contract between the inventor and the public—ideas paid for by time. It is manifest that the utmost good faith is required upon both sides. On the one hand there must really be an invention; no stealing of the ideas of other men, no crude notions resulting only in experiment. The inventor must have something to sell. On the other hand there must be protection—no infringement, no piracy, no stealing of the soul of the invention by clothing it in immaterial changes of form.

THE INVENTOR'S BEST SECURITY IS TO TAKE A PATENT.

To secure this fair dealing we have, on the one side, the Patent Office, with its examiners, its drawings, its models, its books, and its foreign patents, to scan and test the invention. On the other side we have the courts of law to protect the inventor and punish the thief. It is possible that these instrumentalities may do their work imperfectly. This may sometimes happen; but to the extent to which they do it, a fair contract for an honest and useful purpose is made and is maintained. This is the American system. Under its protection great inventions have been born, and have thriven. It has given to the world the steamboat, the telegraph, the sewing machine, the hard and the soft rubber. It has reconstructed the loom, the reaping machine, and the locomotive. It has trained up each trunk of invention until it has become a graceful tree with many branches, adorned with the fruits of many improvements and useful modifications. It has won from the older homes of the mechanic arts their richest trophies, and, like Columbus, who "found a new world for Castile and Leon," it has created new arts, in which our nation has neither competitor nor peer. Without the protection of our Patent laws, no such exhibition as this would have been possible. By far the greater number of the inventions which now crowd the shelves of the Patent Office would be missing. No doubt many weaklings would thus have been spared a contact with a cold and unfeeling world; but many vigorous children, that have come to a robust manhood, would have perished long since for want of sustenance. Men will not take the risk of introducing new inventions, of educating the people in their use, of overcoming opposition and prejudice, unless they can be assured of reasonable protection in their work until their capital has made return. They will not sow that others may reap, and, when the land is ready for the harvest, come forth with greater capital and more laborers, and thrust aside the pioneer who has borne the burden and heat of the plowing and cultivating. For the proper administration of such a system as I have attempted to sketch, it is manifest that much skill and honesty are needed in the Patent Office, in all its departments. Speaking for the gentlemen associated with me, I believe them to be both skillful and honest. They pass in review many valuable interests. They are attended by a body of skillful practitioners. They are beset by an array of eager inventors. If in the examination of twenty thousand applications they make no errors, they would deserve statues of gold. That they make no more, and that in all these years and in all their number well-founded charges of corruption have been few and far between, are strong tributes to their integrity and ability. On behalf of this great American bureau of invention, I bring you greeting to-night; on behalf of the one hundred thousand American inventors whom it represents, I bespeak for it your cordial support and sympathy.

ROQUEFORT CHEESE.

[From the Grocer.]

The preparation and maturing of Roquefort cheese are the most elaborate, careful, and interesting of all cheese-manufacturing processes. In its rich color and blue vein marbling, it bears a close resemblance to our Stilton, the most esteemed by the *gourmet* of all native cheeses, of which, perhaps, it is the most carefully made. The art of dining is an eminently progressive art, and with the advance of knowledge and the refinement of taste, the Roquefort cheese increases in respect. The amiable and witty Brillat-Savarin, who was the most enlightened of gastronomes, has said that a dinner without cheese is like a lovely woman with only one eye. Many other gastronomes go further than this, and declare that no choicely concocted *menu* is complete without *fromage de Roquefort*. It cannot be regarded as a new favorite by any means; indeed it may be said to be as old as the hills which give it birth, for it was a familiar delicacy to the Roman palate, and its praises were sung by Pliny. The birthplace of Roquefort cheese is in the mountains which rise in the southeast of France, half way between the Eastern Pyrenees, and the beautiful but boisterous gulf of the Mediterranean, called the Gulf of Lyons. The village of Roquefort, in the French department of Aveyron, is a place somewhat difficult to get at. It is about ten miles from the railway station at Milhau. It lies on the flank of a mountain in one of the most beautiful valleys of France. It is sheltered by forests of superb chestnut trees, a limpid mountain stream runs before it, while behind tower the rugged sides of the plateau of Larzac, 1970 feet above the sea level. It is upon this plateau that the immense flocks of sheep from whose milk the cheese is made find their food. In the sides of these rocks is excavated a perfect cheese-citadel. The cliffs are honeycombed in every direction with caverns, natural and artificial, some of them five stories in hight. Hence we find in this district a happy combination of requisites; the summit of the plateau offering pasturage, the broad flanks of the rocks caves for warehousing and ripening, while the village so snugly nestling below supplies the human elements of the trade. The food which the ewes obtain upon the stony pasturage is composed of herbs of the choicest flavor, and a great deal of the superiority of this kind of cheese may be attributed to this cause; but it is to the caverns of Roquefort, above all, that the success of the comestible is due. The average temperature of these caverns is about 30° Fahrenheit. The learned have been fertile in theorizing as to the causes of this low and equable temperature; but, according to M. Turgan's great work "Les Grandes Usines de France," to which we are indebted for a great deal of the information to be found here, no generally accepted explanation has yet been given. Whatever may be the cause, these cool vaults were turned to good use by the local shepherds from the most distant times, and Roquefort cheeses are very often mentioned in old French charters. By an edict of the parliament of Toulouse, in 1550, the monopoly of the Roquefort cheese manufacture was granted to the village of that name, and other persons were prohibited from making it. As time went on, and commerce extended, the reputation of these caverns spread till the country folks, for miles around, came to offer payment for the privilege of depositing their cheeses in these rock-warehouses. A better system of trade was inaugurated at a later period. By this improved mode, which simplified the process of production and sale, the producers sold their wares to the proprietors of the caves, who kept the cheeses till they were perfectly ripened, and then sold them on their own account. Just before the close of the last century, the entire trade was in the hands of three rival firms, and the annual production was about 250 tuns. Between the years 1800 and 1815 the production rose to 500 tuns. After the fall of Napoleon, and until about 1830, there was an almost perfect stagnation of trade in France. The cheese fell in price, the three monopolists were ruined, and the Roquefort establishments passed into new and more numerous hands. Subsequently the trade was exposed to vicissitudes, out of which however, it came triumphant, and at the present day it is in a flourishing condition; it is better organized, and its commercial relations are widely extended. As we have stated, the cheese of Roquefort is made from the milk of ewes, of a particular breed, called the Larzac breed, named after the plateau of Larzac, which was their original feeding ground. Some years ago many attempts were made to improve the old style of manufacture, by using the milk of the cow and of the goat, as well as by introducing another breed of sheep; but these experiments always turned out unsuccessfully. Forty years since, General Salignac put to the Larzac ewes some merino rams. He desired to try the effect of crossing—hoping to get blended in the cross-bred animal the milk-producing qualities of the ewes, and the silky merino of the ram. Unfortunately his experiments were imitated by others, for the result was a great falling off in the production of milk. A new order of things now prevails; the sheep-owners seek for animals of the pure race, careful feeding and the best hygienic conditions are relied upon to improve the quality of the fleece. But it is the milk-producing powers of these animals that occupy the farmer's most anxious care. At the present moment there are about 350,000 sheep. We may set down the rams, lambs, sick beasts, etc., at 150,000; the remaining 200,000 are milk-producing ewes. The average value of a three-year-old ewe is 20 francs. At the age of seven years they are fattened up for market, and are sold to the butcher at the September fairs, at an average of 15 francs each. It used to be the plan to feed the sheep exclusively on wild thyme, lavender, rosemary, sage, and mint, together with such other kinds of herbage as could be found growing in the rocky crevices of the stony plateau. A cow could never find sustenance in this region, even if she could pick her way over the rugged ground. Lately, however, various successful attempts have been made to introduce Burgundian hay, which has been found capable of sustaining the almost tropical heat of midsummer in this region. Each ewe yields an annual profit to her proprietor of 28 francs—that is to say, milk, 20 francs; wool, 5 francs; and lamb, 3 francs. The average annual production of six ewes is about 200 lbs., which is about double what they gave a century ago. This increased yield is due to careful keep of the animals; they never pass the night in the open air, but are brought home from the pasturages every evening to clean, spacious, and well-ventilated sheep-folds. After being allowed a rest of one hour, the whole of the ewes are driven out into a roomy courtyard, where they are milked. It requires seven persons to milk, twice a day, a flock of two hundred ewes. The way in which they are milked is somewhat peculiar; each ewe passes through three different hands. The first draws from the teat all the milk he can, by gently pressing the udder; this done, he passes on the animal to the milker seated next him. This latter gives two or three sharp blows with the back of his hand upon the teat, and then milks until the udder appears to be exhausted. The third milker then takes the ewe, strikes it in a similar way, and draws away whatever remaining milk there may be in the teat. It is usual to mix the evening's produce with that of the following morning, obtained before the departure of the flocks for the pasturage. The evening's milk is heated up, but as a rule the morning's milk is not. After being mixed and curdled by rennet in the ordinary way, the curds are subjected to very great pressure to get rid of as much whey as possible. The curd is then placed in earthenware molds, with holes pierced in them. Between the different layers of curd there is placed a small quantity of a bluish-green powder, which is supplied to the ewe-owners by the proprietors of the caves. This powder is nothing else than mold of bread prepared in a certain way specially for this purpose. The powder acts as a ferment, which, during the subsequent sojourn of the cheeses in the caves, hastens the production of those blue veins which the connoisseur exacts in his *fromage de Roquefort*. The cheeses are turned many times during the three days in which they remain in the earthenware molds. They are frequently wiped, so as to dry them without heat, and during the drying stage they are often wrapped in coarse cloths to prevent them cracking. When they have acquired the necessary consistency, they are transferred to the caves. The very best kinds of Roquefort cheese are produced in the immediate environs of the village of that name, but the adjoining valleys of Camarés and Sorgue produce a great quantity of less excellent kinds. The difference in quality is due to the fact that the pasturage is superior in the neighborhood of Roquefort. The cheeses are sold at the various fairs held during the year in the department of Aveyron. A society of proprietors purchases the cheeses from the producers at a fixed price; and by carefully drawn-up agreements the former engage to take all that the latter can produce. By this method, which appears to suit both parties, the precious cheeses escape being hawked about on hot and dusty country roads. They pass at once from the dairy to the caves. Many of the farmers forward their produce to the caves in carts, but for the most part the cheeses are taken thither on the backs of mules, which set out before sunrise so as to escape the heat as much as possible. Each description of cheese has its own distinctive mark, which shows from which dairy it has come. By this mark its maker can always be recognized. Should there be any faults of shape or quality, the maker has to answer for them to the cave proprietor. As a rule, however, the agriculturists never attempt fraud. At this stage, the cheeses weigh about 6½ lbs. each, are about eight inches in hight by four in diameter, and of a shining white color. They are all examined on entrance to the receiving room of the caves, after which they are forwarded to the salting-hall, there to undergo special treatment. The temperature of this salting hall is not less than fifteen degrees lower than the outer re-

ceiving room. The light of day never enters here; every one is therefore provided with a lamp on his entrance.

Although at the period of our visit the weather was very hot and the village outside was infested by quite a plague of flies whose biting powers were perfect, we saw none in the caves—the coldness and darkness were too much for them. The salting-hall is a spacious vault in which the cheeses are piled up after having received a handful of salt on top and bottom. They are stacked up in threes, and every eight days they are turned. By this time the salt has gradually permeated them, and the floor is covered with a quantity of moisture. About six pounds of salt are used for fifty cheeses. From the salting-room they are carried to the more remote vaults, the temperature of which is still lower. These caves, which are mere apertures in the solid rock, afford that low and even temperature to which is due the success of the Roquefort cheese manufacture. A current of icy air runs so swiftly through these gloomy galleries, that an unprotected candle will be extinguished if held up. In these deep caves the cheeses are scraped, a process which is repeated several times. By these means the residuum of salt and other impurities are taken off. They are then piled up once more, in such a way that a free current of air may pass all round them, after which they are left to dry still further.

The women employed in this duty are very warmly clothed, with sabots, thick woolen shawls tied behind their back, and caps covered with a handkerchief. This toilet appears simple enough, but it is made with coquettish care. The hair is neatly braided over the temples, the cap is brilliantly white, the ribbons gay, and the handkerchief of the brightest colors. Nearly 300 women, most of them young, are employed in these caves; and as one goes downstairs at the entrance, one hears the sound of sabots and voices mingling together in a confused Babel of noises. To your sense of smell, there is the prevailing odor of cheese; to your sense of hearing, not an unpleasant vibration of voices. Indeed, some of these women excel in singing snatches from operatic melodies. A never-ceasing activity goes on in these dark caverns lighted only by the little portable lamps which the workwomen carry about with them. These women are called *canvanières*, and are engaged for a season of eight months at a salary of 200 francs. They sleep in dormitories provided by the cave-owners, who also board them. The dexterity of these cheese-scrapers is very great, and their style of manipulation most rapid. They hold the cheese in one hand, lightly pressing it against the breast, while with the other they rapidly pass the blade of a sharp knife over top, bottom, and sides. In this fashion the *canvanières* remove a certain kind of moldiness which is developed upon the exterior of the cheese under the influence of the cave atmosphere. The whiteness and fineness of this moldiness are held to attest the beneficial action of the caves as a maturing agent. If this moldiness ceases to be white and evenly deposited, and becomes more or less thickly coated and darkly marbled, it is a sign that the ripening process is going on badly. This, however, rarely happens, especially in the older caves. The first scrapings are edible, and are made up into little rolls, which are much relished, and find a ready sale in the country round about. After two or three weeks the cheeses no longer put on a white moldiness. The rapidly hardening cheese now assumes a gray tint, with reddish streaks and blue dots. Still the scraping goes on, but there is considerably less to take off. At length, after a stay of between six and eight weeks, the cheese is in a fit condition to be sent into the market. It has by this time acquired the proper reddish tint, streaked with blue veins.

This is the *fromage de Roquefort* so highly esteemed in France and elsewhere. In the months of August and September it is to be found on the table of every *restaurateur* in France; but if the connoisseur would taste it in its highest perfection, he must wait until the month of November, when, if carefully kept, it will be found of truly exquisite flavor.

SPONTANEOUS IGNITION IN WOOLEN MILLS.

John L. Hayes, Esq., editor of the *Bulletin of the National Association of Wool Manufacturers*, gives in an article published in the July number of that periodical, some interesting and important facts in regard to spontaneous ignition in woolen mills, a few of which we extract. Much has been said upon this subject, at various times, in the SCIENTIFIC AMERICAN, yet it is of so much importance, that any facts throwing light upon this source of conflagration, or calculated to put proprietors on their guard are always seasonable.

The combustion of oily wool waste, says Mr. Hayes, is familiar to all older manufacturers; that the cases do not more frequently come under the eyes of manufacturers is due to the precautions now generally in use. Mr. Kingsbury, of Hartford, has informed me of two cases which came under his observation where spontaneous ignition had taken place in barrels of oily waste left accidentally in woolen mills. In both cases, the fires were extinguished without damage. Mr. Gould related to me this circumstance: Some years since a large quantity of what was called clean woolen waste, used in the manufacture of coarse satinets, had been brought from a woolen mill, and stored in a wool-house in Pearl street, Boston. The insurance companies having been informed of the fact, notified the party storing the waste to remove it, on pain of forfeiture of his insurance. Objection having been made to the fastidiousness of the insurance offices, Mr. Gould himself piled up portions of this waste in a yard at the rear of his office in State street. The waste was found to be very oily on handling. The pile was exposed in a damp warm day in August. In less than twenty-four hours the pile took fire spontaneously.

Mr. Badderley, in his report on the fires of London for 1853, says, "The most remarkable case of spontaneous ignition that has occurred for some time, occurred at the residence of Mr. Fletcher, at the Library of the Philosophical Society, in George street, Manchester, who, on entering his room one afternoon, found the sofa on fire. Having dragged it into the yard, and extinguished the fire that was burning in the interior, he found, upon examination, that the sofa had been filled with cap bottoms and rovings, woolen materials, which being greasy had spontaneously ignited."

According to Mr. Gould, my informant, a workman who had been polishing a door of a house in Boston with linseed oil, at the end of his day's work requested that his oily woolen over-clothes might be left in the cellar, which was assented to. At half-past eleven at night, the occupants of the house were awakened by the smell of burning woolens. Upon making search from the attic to the cellar, the door of the latter was opened, and a flame started by the admission of the air showed the combustion in the oiled clothes of the workman. A fire took place at the house of Mrs. Colburn, a neighbor of mine, at Cambridge, Mass., from spontaneous ignition of woolen rags saturated with linseed oil, which had been used in cleaning furniture. Dr. Jackson relates a case where a fire occurred in a house newly-furnished, from spontaneous ignition in a pile of chips of oil-carpeting. The proprietor, from excessive caution, slept in the house before it was occupied by his family, and fortunately discovered the fire and ascertained its cause. Upon stating the case to Dr. Jackson, he says, "My floors are covered with oil-carpet chips; why do they not take fire?" "Because," says the chemist, "the chips not being in contact, the heat is conducted away. In a pile, they accumulate the heat originally induced from the drying oil in the chips attracting the oxygen of the air. Can you set fire to anthracite coal spread upon the floor? No: but pile up the lumps so that the heat may accumulate, and they are readily ignited."

The celebrated Mr. Braidwood, for nearly thirty years superintendent of the London Fire Brigade, says, "Sawdust, in contact with vegetable oil, is very likely to take fire. Cotton, cotton-waste, hemp, and most other vegetable substances, are alike dangerous. In one case, oil and sawdust took fire within sixteen hours; in others, the same materials have lain for years, until some external heat has been applied." He observes that spontaneous ignition is generally accelerated by natural or artificial heat.

The danger of spontaneous ignition in piles of charcoal dust is not generally apprehended. The liability of piles of fine charcoal to ignite has long been known to manufacturers of gunpowder. Mr. Hadfield, in a paper containing "Observations on the circumstances producing ignition in charcoal in atmosperic temperatures," published in the "*Philosophical Magazine*," states generally, "If twenty or thirty hundred of charcoal, in a state of minute division, be put together in a heap, and left undisturbed, spontaneous combustion generally occurs." He states the results of a series of experiments tried by him. The following experiment was the most remarkable: "On the 13th of October, 1831, small charcoal was thrown into a heap which covered about ten feet square, was about four feet deep, and contained two or three tuns in weight. In three days, the temperature had increased to 90°, though it was at first only 57°, that of the air. On the 19th, it was 150°, and on the 20th combustion had occurred in several places." He observes, "This experiment was the most satisfactory one that had come under my notice. The charcoal had been made at least ten or twelve days before it was put together, and had been lying during the interval in small heaps freely exposed in the open air."

I have obtained the following remarkable and instructive examples from Dr. C. T. Jackson. They were originally communicated to the American Academy. At the request of several insurance officers, who regarded the facts as very important, they were published in the Boston papers substantially as here stated.

"Three times," says Dr. Jackson, "I have set fire to charcoal at temperatures below that of boiling water. My first experiment or observation was accidental. I was preparing, while at Bangor, Me., for a lecture, in which I had occasion to show an artificial volcano. I took a tray filled with gunpowder and laid it on a stove to dry. I then took a paper of pulverized charcoal, such as is sold by the apothecaries for tooth-powder, the charcoal being wrapped in white paper, and placed it on the top of the gunpowder which was being dried upon the stove. Having occasion to go out, I took off the paper of charcoal and laid it on the table. When I came back, in about twenty minutes, I observed the paper smoking. The charcoal was completely consumed. During all this time, the gunpowder remained on the stove unexploded.

"My next observation was this: While at work in my laboratory, I had occasion to use a piece of charcoal for blow-pipe experiments. I went down into my cellar, and brought up a piece of light, fine, round charcoal, suited for that purpose. It was damp. I laid it on the top of a column stove to dry, directly beside a tin pan containing water, which was not boiling, and never did boil there. I took the charcoal off the stove and laid it on my table. A short time afterward I discovered that it was on fire all through the piece. I laid it aside, and it burned entirely to ashes. The theory of the ignition of the charcoal under these circumstances struck me at once. Charcoal has wonderful porosity: it has the power of analyzing air, and absorbing the oxygen with comparatively little of its nitrogen. The pores of the charcoal were previously filled with moisture. Drying expelled this moisture. The oxygen of the air was condensed in the charcoal, taking the place of the moisture. The condensation of the oxygen produced sufficient heat to ignite the charcoal. I repeated this experiment again intentionally, watching it carefully, and with the same result." The instructive bearing of these remarks will be shown hereafter, in connection with the subject of heating with steam-pipes.

The theory of spontaneous ignition has already been intimated in the observations of Dr. Jackson upon the burning of charcoal. The spontaneous ignition of oily waste and of charcoal proceeds from the same cause—the absorption and condensation of oxygen. We observe that the contact of vegetable or drying oils with porous carbonaceous substances is most promotive of spontaneous ignition. The drying qualities of these oils, which fits them for paints, is due to their absorbing oxygen from the atmosphere. The porous oily materials absorb and condense the air within their pores. Oxidation then commences immediately, and raises the temperature, which again accelerates the oxidation; and the process goes on, with continually increasing rapidity, till at length the mass bursts into a flame. The low conducting power of such a porous mass greatly facilitates the combustion by preventing the dissipation of the heat generated. The massing of the materials in piles, boxes, or barrels promotes the retention and accumulation of the heat, at first excited by oxidation. Moisture also promotes combustion by supplying oxygen. Besides, it has been recently shown that the simple act of moistening such substances as cotton, hair, and wool, is attended with a slight though constant disengagement of heat. It should be observed that the paraffine oils, or the hydrocarbon oils from petroleum, do not absorb oxygen. Dr. Hoffman, the President of the London Chemical Society, warmly recommends their use for lubricating machinery; saying that "they are safer than many of the oils previously used, inasmuch as they no not absorb oxygen, and consequently cannot undergo spontaneous combustion when smeared upon cotton waste."

Managers and workmen should know that spontaneous ignition is not an accidental and exceptionel phenomenon. With the proper conditions, it is as certain as the firing of gunpowder with a spark. The cask of gunpowder, so instinctively dreaded, will not explode till the spark is applied. The pile of oily waste, harmless and innocent to all appearance, slowly but surely takes from the oxygen of the air the means for its own combustion; itself lighting the conflagration, which, most frequently, bursts forth when manager and operatives are locked in slumber.

The Boiler Explosion at the Indiana State Fair.

The boiler of Sinker & Co., which was in use at the Indiana State Fair, at Indianapolis, exploded on the 1st October, killing nineteen persons and wounding about one hundred persons. The cause of the explosion was, at the time of our going to press, still undetermined.

The scene at the Fair Ground after the accident was most heart-rending. Many of the killed were torn in fragments. In one family, consisting of a mother and three children, the mother was killed and the two older children badly scalded; the youngest was unhurt. A gentleman and lady were walking together; the gentleman was killed and the lady unhurt. Everything is being done to alleviate the suffering wounded that can be done, though it is feared that several will die.

The whole country sympathizes with the sufferers from this fearful calamity, which, although resulting in less loss of life, yet considered in all its aspects is scarcely less terrible than the recent catastrophe at Avondale.

The Manufacture of Steel.

The Paris *Presse* says:—"An experiment of a most interesting character, and having the highest interest for the iron industry, has taken place at the Marquise Stock Works, in presence of two eminent persons of the Ecole Centrale. The object of this experiment was to make steel by one operation, a problem which has engaged all metallurgists, and if solved, would cause an industrial revolution. M. Aristide Berard, an engineer whose name is familiar to all who have occupied themselves with this question, proposed to change second class metal in course of refining into steel of at least ordinary quality, by means of a process alternately oxidizing and reductive. His efforts have been crowned with success. The product obtained by his process, in presence of two competent judges, proved to be steel of good quality, suitable for all purpose, and made with the facility necessary to its application to practical industry. The operation was effected in a reverbatory furnace, lasted about an hour and a half, and was accomplished with as much facility as puddling. In this process, instead of acting on 480 pounds of metal to obtain iron of number one quality, from 6,600 to 11,000 pounds of metal is made by only one operation into steel ingots ready for the workshop, and with an unexpected economy. We will be much deceived if this invention has not in it the germ of a complete revolution in metallurgy."

A patent has recently been granted for a method of refreshing horses while in harness, which consists in making the bit hollow, and having perforations in it. A rubber tube extends from one side of the bit to the carriage, and by pressing a rubber bag which contains water, the driver is enabled to refresh his horse whenever he chooses, without stopping. For saddle horses the water bag is suspended from the horse's neck, or upon the pommel of the saddle.

CORNS.—The pain occasioned by corns may be greatly alleviated by the following preparation: Into a one-ounce phial ask a druggist to put two drachms of muriatic acid, and six drachms of rose-water. With this mixture wet the corns night and morning for three days. Soak the feet every evening in warm water without soap. Put one third of the acid into the water, and, with a little picking, the corn will be dissolved.—*Jessie Piesse.*