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### Improvement in Starch Gum and Grape Sugar Manufacture.

Mr. Hoffmann, a chemist in Beardstown, Ill., has invented an improved method of converting starch, corn or other grain into dextrin gum or grape sugar. He uses steam, diluted acid and water, at a much higher temperature than the boiling point of water in an enclosed and steam tight mash tub. To every bushel of grain about twelve gallons of boiling water are used, and an additional quantity in proportion to the pressure of the steam; one or two per cent of the weight of corn, of weak sulphuric acid is also employed. These are gradually added together, and mashed under steam pressure for two or three hours, the starch of the corn is converted into dextrin, and by the addition of chalk or marble dust to neutralize the acid while at the atmospheric pressure, and when all the acid has been neutralized and the whole has stood for an hour or so, the starch gum can be obtained by evaporation; by continuing the steaming process for a longer period grape sugar is obtained. This process considerably cheapens the manufacture of alcohol, and for the benefit of such as may be interested, we give the claim of the patent:—

"What I claim as my improvement is the combination of steam and acids for converting starch, corn or other cereals into dextrin, gum, or sugar, when said grain is subjected to the action of diluted acids and the temperature of the mass is elevated to 225° or 300°.

### Fishes Traveling by Land.

Dr. Hancock, in the "Zoological Journal," gives a description of a fish called the "flat head hassar," that travels to pools of water when that in which it has resided dries up. Bose also describes another variety, which is found in South Carolina, and, if our memory serves us well, in Texas, which, like the "flat head," leaves the drying pools in search of others. These fishes, filled with water, travel by night, one with a lizard-like motion, and the other by leaps. The South Carolina and Texas varieties are furnished with a membrane over the mouth, by which they are enabled to carry with them a supply of water, to keep their gills moist during their travel. Guided by some peculiar sense, they always travel in a straight line to the nearest water. This they do without the aid of memory, for it has been found that if a tub filled with water is sunk in the ground near one of the pools which they inhabit, they will, when the pool dries up, move directly toward the tub. Surely this is a wonderful and merciful provision for the preservation of these kind of fish; for, inhabiting as they do, only stagnant pools, and that too, in countries subject to long and periodical droughts, their races would, but for this provision, become extinct.

## MEYER'S REVERSIBLE CAR SEAT AND COUCH.

Fig. 1

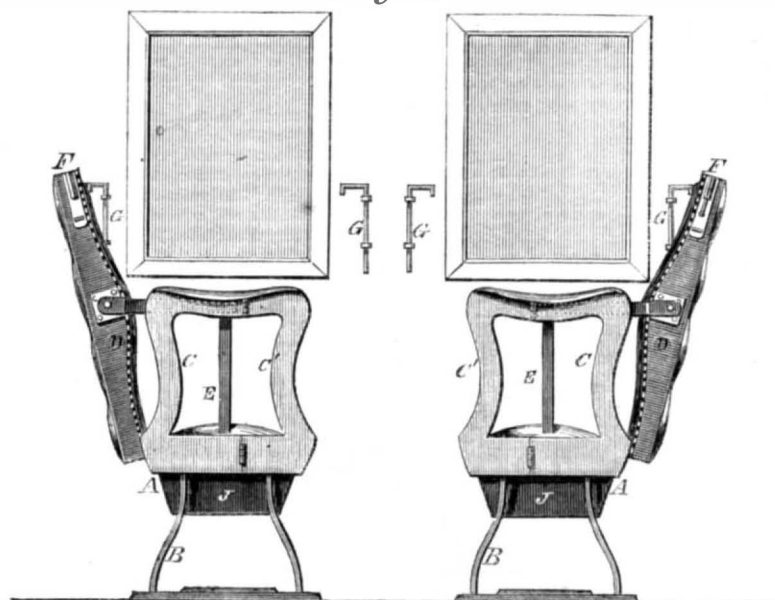
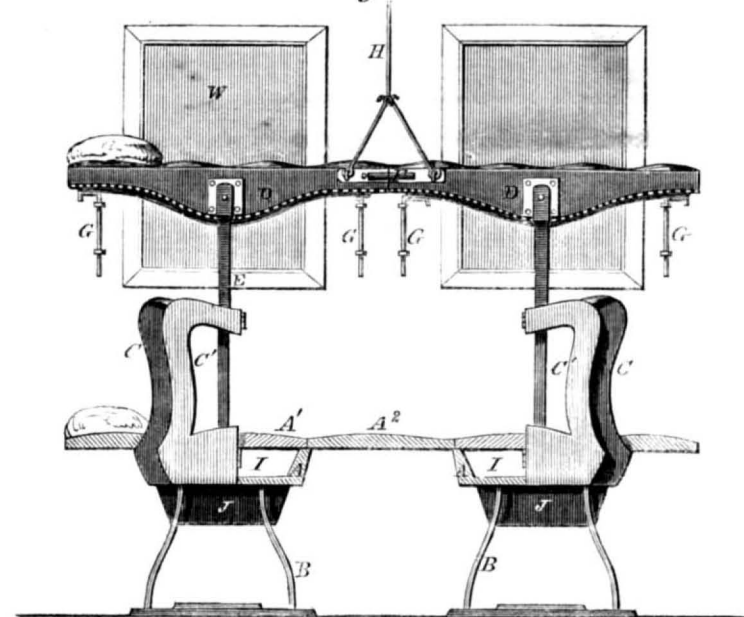


Fig. 2



Since the trial of car seats capable of being converted into sleeping couches, on the Michigan Central, and other railroads in the West, numerous plans have been devised with a view of remedying the defects which experience has made manifest attending those in use.

In this improved plan the objectionable feature of transverse partitions is avoided, and reversible seats having all the conveniences and comforts of the usual form of car seat are provided, which can in a few moments, and with little labor, be converted into double sleeping couches, capable of accommodating all the passengers in the car.

In our illustrations, Fig. 1 represents a side elevation of two of the car seats in a position to be occupied by the passengers in a sitting posture, and Fig. 2 is a side elevation of the same seats converted into double sleeping couches.

A represents the frames on which the bottoms, A', of the seat's rest, being supported on legs, B. C are the arm rests at the end of the seats, one half of which, C, is made permanent, and the other half, C', hinged to the same, to admit the swinging half to be

opened and brought parallel to the permanent part. D are the backs, cushioned on both sides, and attached to the arm rests, C, by pivoted bars, E, so as to enable them to be reversed at pleasure. F are bolts, secured to the upper corners of the backs, D, and parallel with the ends of the same, so as to admit of their being forced into corresponding hasps on the ends of the backs of the next seat, and in the same relation thereto as the bolts to their back corners, in such a manner as to enable the upper edges of the backs, when brought together in the position represented in Fig. 2, to be secured on line, and by the assistance of dowel pins, projecting from the edge of one seat, and entering corresponding openings in the edge of the other, and a suspension rod or cord, H, having hooks at its end, which are attached to staples at the ends of the backs, to be sustained in a sufficiently firm manner at their ends next the passage way through the car, to prevent them giving way when employed as a double couch.

When it is desired to convert the bottoms and backs of the car seats, as represented in Fig. 1, into the sleeping couches represented in Fig. 2, the swinging portions, C', of the

arm rests are opened, and the cushioned backs, D, are turned upward, and brought to a horizontal position, with their edges in contact, and being secured and sustained by the bolts, F, dowel pins, and suspension hooks attached to the wire or cord, H, at their inner ends, are further sustained at their ends next the sides of the car by swinging hooks or bars, G, which can be turned parallel with the sides of the car when not employed for this purpose. This system of arrangement forms the upper tier of couches, the edge of each back pressing against the next in succession, and thus forming a brace for them all. The additional cushioned frames, A<sup>2</sup>, on top of the bottoms, A', of the seats, are then placed between the said bottoms, A', and on a line with the same, with their edges resting on the ribs or projections on the sides of the frames on which the bottoms rest, so as to form a continuous additional tier of double berths or couches at a proper distance apart, to enable a free ventilation of air from the window, W. The couches thus formed may be provided with longitudinal division bars or rails, and pillows and other articles of bedding, which, when not in use, can be stowed away in the spaces, I, J, below the bottoms of the seats; and if necessary, folding curtains may be attached to each set of berths, to ensure privacy where needed.

The advantages claimed for this plan of seats are, that it affords all the conveniences, including perfect ventilation, of the ordinary car seats, with the comforts of a sleeping car, and that the expense of rendering them susceptible of this change is but slight. It is, moreover, applicable to almost all railroad cars at present in use.

It was patented September 19, 1854, by H. B. Meyer, of Cleveland, Ohio. Any further information can be obtained by addressing the patentee, or Albert J. Meyer, M.D., No. 110 Grand street, New York.

### Cleansing Cotton Seed.

A competent correspondent, residing at Antwerp, writes to the Washington Union that a machine for cleansing cotton seed has lately been invented and operated in that city. From two to three tons of seed can be cleaned per day by a machine of four horse power, with the assistance of three persons. The cotton surrounding the seed is taken clean off, and can be sold to carpet manufacturers and paper makers at from thirty to fifty francs the one hundred kilogrammes—about \$10 the two hundred and twenty lbs. After the oil is extracted, the cakes remaining can be sold for the same price as other cakes of oleaginous seeds. The cost of the machinery is said not to be expensive. This is an important invention, and promises to be of great advantage to cotton growers.

### Rather Disgraceful.

A subscriber complains to us that he sent a gold pen to be re-pointed (with twenty-five cents) to L. H. Martin, of 253 West 25th st., New York, who advertised in our columns, and that he has not heard of pen, money, or Mr. Martin. This is rather disgraceful; and although we are in no way responsible for our advertisers, we wish that no person would use the SCIENTIFIC AMERICAN as a vehicle of publicity without they intend to fulfil their engagements. It is not the first complaint we have had of the same person, which we are sorry that we cannot help; but we have no intention of being innocently made a party to any humbug whatsoever.





New Inventions.

Protection of Horses against Flies.

In view of the miseries attending the best cared-for horses at this season of the year, it behooves all who can in any manner alleviate them, or in any manner add to the comfort of this noble animal, to take the largest possible field, and seize every opportunity for the spreading of his benign influence. We therefore lay before our readers an old method of protecting horses against flies, which has been again brought to mind by the *Irish Farmer's Gazette*, and which is, in substance, as follows:—

“Previous to taking the horse out of the stable, sponge him well with a decoction of laurel leaves about the head, loins, and other sensitive parts. The decoction is made by boiling the leaves in water for a considerable time, and being poisonous, it should be kept carefully when not desired to be used.”

This is said to be a preventive to his being stung and annoyed with horse-flies. A late statement in the *Moniteur d'Agriculture*, of Paris, reminds its readers that M. de Serre, the famous French agriculturalist, ascertained that a decoction of the leaves of the walnut tree, applied to horses and other animals as a wash, will be found complete protection against the sting of all insects. These are simple remedies for a serious annoyance, and we would recommend their immediate trial.

New Water Wheel.

The invention which the accompanying illustration depicts, and the following description elucidates, enables the wheel to be raised and lowered as circumstances may require, and the water can be directed into the buckets, at any point of the wheel within the range of its adjustment. The buckets are also peculiarly constructed, so as to obtain a large percentage of power, and the whole wheel is simple and economical.

Fig. 1 is a perspective view of the wheel, Fig. 2 is a detached perspective view of a bucket, and Fig. 3 is a section of the same.

A represents a circular cast-iron plate, which is fitted loosely on a vertical shaft, B, which has a square base, so that the wheel and shaft will rotate together, and the plate be allowed to rise and fall on the shaft. On the lower part of B an inverted conical hub is formed, and through the plate, A, four screws, b, pass vertically, the lower ends of the screws resting on the conical hub. The shaft, B, is stepped into a crossbar on the frame, c, and the upper end has its bearing in a crossbar, d. The upper surface of A has radial grooves in it to receive the arms, e, and they project far enough from the periphery of A to hold the buckets, C. These buckets are of cast-iron, and are of peculiar form, which is better seen in Figs. 2 and 3. The buckets are formed each of two parts, one part receiving the percussive force of the water, and the other part receives the force from the gravity as it leaves the bucket. The upper part, f, of the buckets are formed of a top piece, g, a back, h, and side, i, and a bottom-piece, j; the top piece, g, and side, i, project from the back, h, so as to form the angles with it, and the bottom piece, j, only extends about half-way across the bucket, a space, k, being allowed, which space forms the orifice of the lower part, l, of the bucket. The lower parts, l, are of scoop form, the bottoms being inclined at about an angle of 45°. The outer edge of the back, h, of each bucket has an eye, m, through which the arm, e, passes, and the front edge of the side, i, is notched to receive the arm of the bucket immediately before it. Each bucket, therefore, serves as a bearing for the arm immediately before it, and each bucket is bolted to its arm by bolts, a. The plate, A, and buckets, C, are covered by a plate, D represents the sluice through which the water passes to the wheel, and E is a cylindrical case in which the wheel is fitted. The sluice, D, is made to communicate with the case, E,

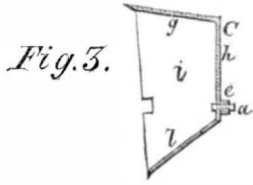
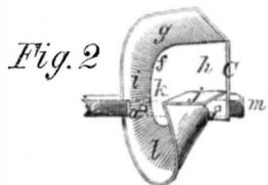
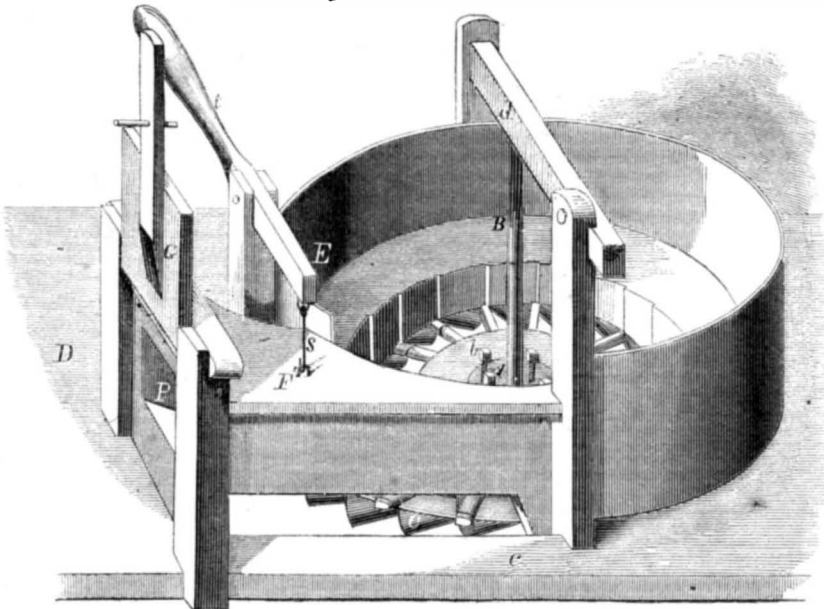
by means of an adjustable mouth, F P, which can be raised up and down by lever, t, and link, s. G is a sluice gate that regulates the quantity of water.

The operation is as follows:—The wheel may be raised or lowered within its case, E, by the adjusting of the screws, b, and the

water is directed properly into the buckets, C, at whatever height the wheel may be placed by adjusting the mouth, F, by moving the lever, t. The wheel, therefore, may be adjusted according to the height of the water, so that an uniform fall may be obtained. The water first acts against the upper parts, f, of

CUSTER'S IMPROVED WATER WHEEL.

Fig. 1.

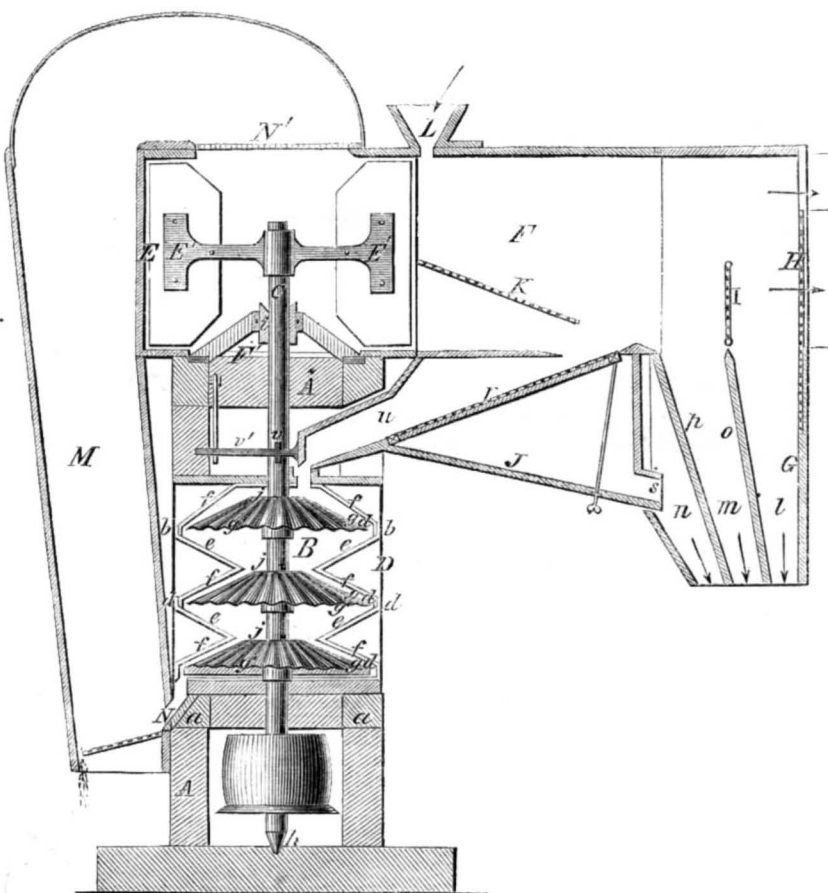


the buckets, by impact and in passing down into the lower parts, l, of the buckets, and out from them a force is obtained by the weight or gravity of the water, and owing to the form of the buckets, as shown, the water is allowed to pass very directly through the buckets, so that there is but little power lost by friction. The buckets by being attached by arms to the

center plate, arranged as shown, it renders the construction of the whole extremely simple, and susceptible of being readily repaired in case of a bucket being broken.

It is the invention of John Custer, of Findlay, Ohio, from whom any further information can be obtained. A patent was granted May 5, 1858.

DONEHOO'S SMUT MACHINE.



The object of this invention is to combine in one machine the great requisites which are essential to clean wheat from all foreign substances before grinding, namely, a capability of separating all lighter foreign substances by blast; separating by screening all

such foreign material that will not pass off by the blast; depriving the grain of all smut which may not have been blown off before arriving at the scouring cylinder, and lastly, depriving the wheat by a light suction, of dust, as fast as it passes from the scouring cylin-

der, without lifting and interfering with its discharge. How these points are attained will be seen by the following description, reference being made to the illustration, which is a vertical longitudinal section of the invention.

A is the frame of the machine, and B is the scouring chamber, supported by the cross-pieces, a a. This chamber is formed of a series of chambers matched together as seen at b, and the castings are of such a shape as is indicated by f e d, the surface of e being plain, while that of f is fluted to correspond with the flutings, g, on the conical scouring plates, j, that revolve within the chambers, d e f, by being supported on and attached to the central vertical shaft, C. The chambers and scouring plates are encased by an outer cylinder, D. By thus forming the scouring plates conical, and the chambers to match, the grain is subjected to a very large scouring surface, retarded in its progress, and its gravity still made available to assist in its escape as fast as acted upon.

E is the fan cylinder, within which the fan, E', arranged on the shaft, C, rotates. The fan case terminates in a horizontal blast spout, F, which gradually flares laterally as it reaches its discharge end. F' are two valves at the bottom of the fan case for admitting more or less air to the fan, accordingly as it is desired to have the strength of the blast. G is the vertical spout for separating the various qualities of screenings from one another; it is placed in the end of the blast spout, and is closed at top, but open to a certain extent on the other sides; its lower end is divided into three passages, l m n, by means of partitions, o o. H I are two sliding screw gates formed partly of wire gauze, and they are made adjustable, and serve for separating the different qualities of screenings from one another, as soon as the wheat is separated therefrom, and by having them adjustable they can be regulated in height to suit the specific gravity of different kinds of wheat. J is the shoe which receives the wheat as it falls through the blast from the wire gauze chute, K, of the hopper, L. This shoe is formed of two inclines, r s, r being of wire gauze and hinged at u, and capable of adjustment by a set screw, and the other incline, s, allowing the cockle that falls through r to pass into the spout, G. The advantage of having this incline adjustable is that it can be made more or less inclined to suit the amount of cockle in the wheat, the greater quantity of cockle requiring a less incline in order that the wheat may remain longer in contact with the incline, so as to separate the whole of it. Another advantage is, that, the shoe itself does not require adjusting, and consequently the space between the fan case and the scouring chamber does not require to be great, in order to allow for adjustment. The vibration of the shoe is effected by means of a cam, v, on the driving shaft, this projection striking the rod, v', in the revolution of the shaft. M is a suction spout, leading up from near the bottom of the frame to the fan case, and communicating with the scouring chamber by a passage, N, and with the fan chamber by a passage, N'. In the opening, N', is a valve which regulates the draft through the spout, and thus avoids the lifting up of the grain through the spout by too great suction. At the bottom of the spout, there is, as usual, an inclined wire gauze screen or chute for the grain to pass over in its discharge, and so be deprived of its dust just before leaving the machine.

This most perfect smut machine is the invention of Daniel M. Donehoo, of Hookstown, Pa., who will be happy to furnish any further particulars of the machine or other business. It was patented March 16, 1858.

AGRICULTURAL EXHIBITION.—The Agricultural Association of Upper Canada holds its annual exhibition at Toronto on the four days included between Sept. 28 and Oct. 1. On the list of prizes which we have received, there is this remark, “Open to all Canada.” Why not be liberal, and open your prize list to all America?

Scientific American.

NEW YORK, AUGUST 7, 1858.

Mechanics' Fairs.

Among other improvements which mark the character of the present age is the attention bestowed by men of sense and education on the highly useful and liberal policy of providing popular exhibitions, illustrating in themselves the progress, and in many cases the history of the several branches of sciences and the mechanic and more polite arts. Such exhibitions not only afford satisfaction to every lover of his country, and every friend to the welfare and prosperity of mankind, but impart to the thousands who visit them the most impressive, useful, and comprehensive lessons in the history of invention and the arts, and their application to the various branches of industry and every-day life. In viewing the miniature construction and operation of the most intricate piece of machinery, the untutored mind is enabled to grasp and comprehend its nature and operation, and appreciate its benefit, and the ingenuity and skill expended in its production, and to thus acquire a knowledge which it would be difficult to convey through the more slow, tedious, and (to many) distasteful processes, laid down in books. In order that the ingenious and useful contents of these exhibitions may be presented in the proper form and order, equally to the emolument of the learned and the less perplexing of the unskilled and more ignorant observer, we would suggest to those having them in charge, as well as to the exhibitors, the observance of one or two rules, which will tend to destroy the prejudice existing against them, and enable them to fulfill the praiseworthy objects they are designed to accomplish.

To render such a fair or exhibition effective in the particulars we have mentioned, it is necessary that it should be what its name implies, under the superintendence of peculiarly disinterested and impartial men, whose sole object is to benefit science and the mechanic arts and their fellow men, by displaying to the world, in the most familiar and instructive manner, the manifold results of the ingenuity and skill of the inventive mechanics and others, with which our country fortunately abounds. These men should be practical, and beyond reproach in their characters, and of such occupations and stations as to properly represent the several classes and branches of business to which the exhibitors and the results of their skill and genius belong. In the selection of committees to examine, report upon, and award testimonials of superiority to meritorious inventors, skillful mechanics, and the other marked producers of articles on exhibition, a sole regard should be had to their ability and honesty to faithfully fulfill the trust reposed in them. It is too often the case that the prominent members of agricultural and mechanical fairs are not only unfitted for the responsible positions they hold, but are mainly of that class of men who assume such stations solely with a view to notoriety, and to their own emolument, or the emolument of others; or who, being deficient in the knowledge and judgment necessary to distinguish the meritorious from the unskillful, are governed by the designing, or their personal partialities. Hence it is that the annual fairs and other exhibitions held at different sections of the country, which, if properly carried out, would produce great good and rational enjoyment, are diverted from their purposes, and made to injure, rather than encourage science and the mechanic arts.

Another rule which we would commend to the attention of the superintendents and exhibitors, is that of proper taste and judgment in the method of the arrangement of the articles being exhibited, so as to properly display their character, and enable them to be fully understood. They should be comprised together in the classes to which they respec-

tively belong, with a distinct space between each other; and where they are of such a nature as to prevent them being understood from the descriptive title or explanation marked on them, a person should be in attendance to describe them and their points of excellence. When a series of machines are on exhibition for performing the different operations necessary in the fabrication or treatment of a particular article, they should be arranged in the proper relative positions with each other, to illustrate the various successive stages through which it passes, with samples to show the effect produced at each stage, and in this manner a full knowledge could be acquired, in a short time, of all the details of the manufacture of the most useful articles and fabrics; as, for instance, the familiar articles of sugar and cotton, through the various operations necessary to change them from the crude state they appear in when in the forms of fresh cut sugar cane and cotton bale, to the respective and beautiful granulated and woven states necessary for consumption and wear.

We trust that these few and brief suggestions will be received in the same spirit of sincerity in which they are dictated, and that those really having the interest of the arts and sciences and their fellow men at heart, will at once set to work in the same spirit, to remove the evils attending the associations having these fairs in charge; and by disarming suspicion inspire that confidence and attachment with which it is indispensable to the public welfare that they should be regarded.

To make Brass and Alloys.

The fusion of metals and the mode of mixing them in the crucible to form alloys require much care, because alloys are very difficult to make, especially when the metals, of which they are composed are of such a character as have a kind of antipathy for each other—such, for instance, as copper and lead. The method to pursue in mixing them is as follows:—First, melt the least fusible of the metals (that requiring the highest temperature) of which the alloy is to be composed, and after it is fused, keep up the heat until the metal acquires such a temperature as will bear the introduction of the other metals without instantaneous and sensible cooling. After this, introduce the other metals in the order of their infusibility—the most difficult to melt first. Whatever may be the proportions of the metals, it is indispensable to melt the most refractory first, and especially when it is to be the principal base, such as copper in all brasses. The liquidity of this metal gives, indeed, the measure of the temperature necessary to complete the alloy. All the metals to be added, after the most refractory is first added, should be heated in the flame of the furnace, in order to elevate their temperature, so that there should be as little difference as possible between the heat of the molten metal in the crucible, and that to be added to it. This is especially necessary when a volatile metal, like zinc, is to be added to copper, because when it is melted very suddenly, it is liable to crack the crucible. The contents of the crucible must be stirred well after the introduction and fusion of each of the component parts of the alloy. When all are added, the crucible is covered, and an increased heat given to the fire—intense according to the difficulty with which the metals enter into fusion. In alloys containing a large proportion of zinc, the surface of the metal in the crucible should be covered with a thin layer of charcoal powder. This precaution is not necessary, unless the alloy contains a metal requiring a high temperature for its fusion, as, for instance, copper or iron.

In alloys containing tin, however, a layer of charcoal placed in the crucible is liable to convert part of the metal into dross, therefore ground clean sand should be used in place of it. All alloys should be vigorously stirred when run into molds. The crucibles employed should be thoroughly cleaned after each operation. Such are the general conditions

which should be followed in making alloys. Copper melts at 1920° Fah.; zinc at 700° Fah.; lead at 590° Fah.; tin at 450° Fah.; cast-iron at 2100° Fah. A dull red heat is estimated at 1489° Fah.; a bright red heat at 1830° Fah., and a white heat at 2910° Fah. In practice it is generally found that a minute quantity of old, introduced into a new alloy imparts to the composition greater homogeneity. Alloys should be first cast into ingots, then re-melted to be cast into boxes, or any article for which they are required. Why this should be done is simply a matter of practical experience, it having been found that castings of bronze and brass give, at the second melting (when the proportions of the metal are correct), a cast of a superior grain and a greater soundness.

An alloy composed of zinc, tin, lead and copper, should be made by forming the three first metals into an alloy and casting them into ingots, then melting the copper, and adding this alloy to it. By this mode of making the copper alloy, a very superior casting is obtained.

In England where the manufacture of brass is carried on very extensively, the furnaces employed for smelting have movable covers of a dome shape. The crucibles employed are of Stourbridge clay, one foot deep and eight inches in diameter, each furnace holding nine crucibles. The duration of a charge is twelve hours; the fuel used is coal and coke, and 64 pounds of copper and 88 pounds of ground calamine (zinc ore) are the proportions of each charge. When a heat of twelve hours is completed, the crucibles are taken out with tongs, the brass is skimmed to remove the slag, and the molten alloy then run into ingot molds. Muntz metal, so well known, is composed of 60 parts copper and 40 parts of zinc. Muntz obtained a patent in England for the application of brass sheathing for ships, and when he died a few years since, he left a fortune of £600,000—about three millions of dollars—all made by his patent. He was an able business man, and knew how to work his patent to the best advantage, hence his great success.

A brass composed of 4.69 copper and 31 zinc is very suitable for hammering. A brass of 5.64 copper and 36 zinc is useful for brazing iron; 6.75 copper and 25 zinc; 7.51½ copper, and 27¼ zinc. In general, common brass may be calculated to contain 2 parts of copper and 1 of zinc. Dutch metal is composed of 84.5 copper and 15.5 of zinc. It is of a pale yellow color, and so malleable as to be capable of beating out into leaves, and so thin as to be employed for cheap gilding. Chinese brass is composed of 56.9 copper, 38.27 zinc, 3.30 lead, 1.08 tin, and 1.48 iron. It is very strong and durable. A little lead improves brass for turning purposes, and it is usual to put it in just before pouring out, and about three ounces of lead to ten pounds of brass is the amount used.

Fine brass wire is woven into fabrics like those of cotton yarn for sieves, bolting cloths, &c. Tin wire is made into a warp for the loom, the weft wound on a spool, and placed in a shuttle which is thrown by the weavers by hand, from side to side, in the same manner that old-fashioned hand loom cloth weaving was executed. Two men are necessary to work one loom, each throwing the shuttle alternately. Brass wire has some peculiar properties. When annealed it is very soft, easily bent, and woven in the loom, but it must be rendered elastic for common use. The elasticity or spring is imparted to it by stretching and heating in a frame; in other words, "the spring is licked into it." When kept for a considerable length of time in a state of high tension, brass wire is liable to snap suddenly. It should therefore never be employed, as it oftentimes is, for suspending chandeliers and such like objects.

NITRE BEDS.—At Bahia, in the Brazils, near Sao Francisco river, 180 leagues from the city of Bahia, a great natural deposit of nitrate of soda has been discovered, extending sixty miles along the valley.

Painless Extraction of Teeth.

Various methods have been resorted to for the purpose of alleviating the excruciating agony consequent upon the extraction of teeth; but as the general anæsthetics are in all cases tedious and troublesome in their application, and often attended with fatal and dangerous results, sufferers, rather than experience the momentary pain of extraction, or run the risks of general or local anæsthesia from the means heretofore employed, impair their health by retaining in their mouths diseased teeth and roots. To avoid the dangerous results of chloroform, and to do away with the employment of the not either harmless or efficient process of freezing mixtures to the jaw, Mr. Jerome B. Francis, of Philadelphia, has invented a method of producing local anæsthesia by the application of an electric current, and through this means to effect the painless extraction of teeth. The application is simple, and consists in attaching to the forceps the negative pole or flexible wire of the ordinary electro-magnetic machine, or graduated battery, and placing the metallic handle of the other or positive pole in the hand of the patient, and by this means to cause an interrupted current to traverse the body of the patient and the extracting instrument. The intensity of the current is previously graduated while the patient grasps the forceps and handle, until it is just distinctly perceptible, and the circuit through the tooth is not completed until the moment at which extraction is to begin. This interruption is said to be desirable until the forceps are placed upon the tooth, when the circuit is formed, and the extraction made at once. How this annuls pain we cannot determine, but that it has, in a large number of cases, we are satisfied from the representations of able dentists in this and other cities. This novel process of extracting teeth was patented the 25th of May, 1858, and the claim is to the combination of the electro-magnetic machine, with the dental forceps.

Blanchard's Steam Engine.

The principle that a fire can be made to give more heat, and the fuel more economically burned, by means of a mechanically forced blast than by a chimney draft, has been thoroughly demonstrated by Mr. F. B. Blanchard, of this city; and when the heat which is not used in the boiler is made to superheat the steam, and afterwards heat the feed water, a still greater economy and consequent saving of fuel is obtained.

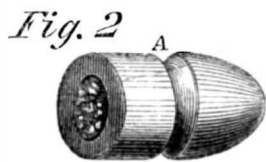
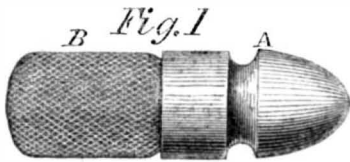
The *John Faron*, a steamboat of 250 tons, not built on a model adapted for high speed, has had Mr. Blanchard's improvements applied to her, and so well and economically is the fuel burned that a small six-inch stove-pipe is sufficient to carry off the products of combustion. A few days ago we had an opportunity of personally observing the value of this improvement on board this boat, during one of her ordinary passages from this city to Haverstraw, on the Hudson—a distance of forty miles. She made this distance in 3¼ hours each way, at an expense of 1,375 lbs. of fuel the forty miles—a most astonishingly small quantity of coal for a boat of her size and build. She lies at the village of Haverstraw all night, and so well is the heat cared for and fostered that without firing up during twelve hours, the steam was kept up, and only lost about ten pounds pressure from six o'clock one evening to the same hour next morning. In a few weeks we shall give engravings and a full description of this valuable invention.

Petition for Extension of Patent.

F. E. Sickles has petitioned for an extension of his patent for opening and closing valves of steam engines, which expires on the 19th of October, 1858. The petition will be heard on the 4th of October next, and all persons opposing the extension are notified to show cause, if any they have, why it should not be granted. The testimony will be closed on the 20th of September, and rules for taking the same can be had by addressing the Commissioner.

**Norton's Gossamer Cartridge.**

One of the most practical inventors at the present time in England is Captain Norton, who has for many years turned his attention chiefly to the improvement of implements of war, and who has in the course of an active life produced so many inventions that we can only enumerate a few of them, viz.: an elongated rifle shot and percussion shell; a percussion hand grenade, for the protection of private dwellings in case of riots; a railway guard and passenger signal; rifle fire shot; a safe way of fixing percussion appliances in the mouth of rifle shells for rifle cannon; concussion fuze; liquid-fire rifle shell; percussion blasting cartridge; artificial stone rifle shot; improved cordage; fog alarm signal; and the subject of our illustration, the gossamer cartridge, which we copy from the *London Engineer*.



The object of this cartridge, B, is to prevent the necessity of the soldier biting off the end of the cartridge, a very injurious operation. The cartridge is made by putting the powder of the charge in a small bag or cap of thin paper without any previous preparation of the paper, and then adding strength to this thin covering by enclosing it in a small piece of common cotton net as shown in the illustration, the cavity of the shot, A, being roughened out, for the purpose of readily attaching the cartridge to it.

An experiment was lately tried with cartridges constructed upon this principle, with the ordinary Enfield rifle, and it was found that without puncturing or piercing the cartridge previous to loading, the flash of the percussion cap was amply sufficient to penetrate the thin paper through the opening of the network, and fire the charge. The soldiers of the fort who witnessed and tried the experiments were much pleased with the cartridges, as being a great improvement on those at present in use. On firing the rifle the net is carried out, leaving no residue whatever in the barrel. The net secures the thin paper that encloses the gun cotton or gunpowder, and prevents it from bursting when pressing the gun cotton or gunpowder into it. Major Strath, professor of fortification, referring to some experiments he had made upon cartridges both in paper and linen, and of which the present invention is an improvement, states that "the motion of biting the cartridge being saved, time is saved in loading, and the entire charge, without the usual waste, is always delivered into the piece." In making the present cartridge the thin tough paper is first placed with its center on the point of the mandril or former, and the net in the same manner over the paper, both together are then pushed into the tube mold, the ends are drawn down, and the mandril drawn out, the powder or gun cotton is then put in and the ends of the paper and net are tied up. In preparing it for Sharp's breech-loader, Captain Norton places a little gun cotton first in the lower end of the cartridge, and gunpowder over the cotton, the fire from the cap being certain to fire the cotton, although it may not always fire the gunpowder through the thin paper.

In a paper which Captain Norton read recently in the United Service Institution, London, he gave a full account of his numerous inventions, and the assembled *élite* of Great Britain's army and navy listened with great attention to the man who had done so much to improve the so-called art of war.

**Another Supposed Cause of the Potato Rot.**

We some time since gave a theory in regard to potato rot, and a novel and curious method of preventing the same by the insertion of peas in the seed potato. We now find in the *Buffalo Commercial* an account of another cause for this destructive disease, discovered by Mr. Alexander Henderson, of that city. He thinks it is produced by an insect, the egg of which is laid on the skin of the potato, is invisible to the naked eye, but may be detected with a microscope, and is planted with the seed potato. The egg is hatched in about six days, and the young insect remains in the ground until he gets wings. In the meantime he is engaged in stinging the tubers, each perforation poisoning the root and begetting the rot. While yet in the ground, and as early as the tenth day of existence the young insects cohabit, and from the great rapidity with which they propagate, Mr. H. argues that the egg is deposited before the first emergence from the ground, although in case of cold wet weather, the insect sometimes leaves the vines and returns to the tuber. Only a few days are required for the entire destruction of the vine. The insect is remarkably industrious, but the destruction of the vine does not affect the tuber except to stop its growth. The *Commercial* gives further particulars, as follows:—

"Mr. Henderson states that he discovered the bug on the vines in 1850, but thought it was confined to them. During the last year he has found it on the tubers, and watched its effect upon them. It appears on the vines in from two and a-half to three months after planting, according to soil and manure—a richly manured soil producing the perfect insect sooner.

"A short time since Mr. H. left at our office a glass jar containing a sound and healthy potato plant, with which were confined some six or eight of the insects alluded to. The insect itself we cannot describe scientifically. It is about half the size of the common house fly, of a brownish color, has six legs, two pair of wings, two antennæ, and a long strong proboscis. The insect was actively engaged upon the various portions of the plant, and in the course of twenty-four hours it was evidently diseased, the leaf becoming brown and mouldy, while the stalks, in the course of two or three days, suffered a putrescent change; in four days some of them fell over by their own weight, the stalks being swollen and softened in some places quite to a jelly of a sickly green color.

"If we put a stop to the planting of the egg with the seed potato, we stop the propagation of the insect. The egg being invisible, any means applied should be thorough, and reach the whole surface of the root. Mr. H. states that by sprinkling quicklime over the potato, as it is cut for planting, the moisture will dissolve the lime and bathe the tubers in a caustic alkali, which will destroy the eggs. At this time of the year the ravages of the insect may be prevented by packing the earth around the tuber firmly with the foot, which will smother the insect."

**Origin of Brandy.**

Brandy began to be distilled in France about the year 1313, but it was prepared only as a medicine, and was considered as possessing such marvellous strengthening and sanitary powers that the physicians named it "the water of life," (*l'eau de vie*), a name it still retains, though now rendered, by excessive potations, one of life's most powerful and prevalent destroyers. Raymond Lully, a disciple of Arnold de Villa Nova, considered this admirable essence of wine to be an emanation from the Divinity, and that it was intended to re-animate and prolong the life of man. He even thought that this discovery indicated that the time had arrived for the consummation of all things—the end of the world. Before the means of determining the true quantity of alcohol in spirits were known, the dealers were in the habit of employing a very rude method of forming a no-

tion of the strength. A given quantity of the spirits was poured upon a quantity of gunpowder in a dish and set on fire. If at the end of the combustion the gunpowder continued dry, enough it exploded, but if it had been wetted by the water in the spirits, the flame of the alcohol went out without setting the powder on fire. This was called the proof. Spirits which kindled gunpowder were said to be above proof.

From the origin of the term "proof," it is obvious that its meaning must at first have been very indefinite. It could serve only to point out those spirits which are too weak to kindle gunpowder, but could not give any information respecting the relative strength of those spirits which were above proof. Even the strength of proof was not fixed, because it was influenced by the quantity of spirits employed—a small quantity of weaker spirit might be made to kindle gunpowder, while a greater quantity of a stronger might fail. Clarke, in his hydrometer, which was invented about the year 1730, fixed the strength of proof spirits on the stem at the specific gravity of 0.920 at the temperature of 60 degrees. This is the strength at which proof spirit is fixed in Great Britain by act of Parliament, and at this strength it is no more than a mixture of 49 pounds of pure alcohol with 51 pounds of water. Brandy, rum, gin, and whisky contain nearly similar proportions.

**Consumption of Tobacco in France.**

The *Genie Industriel* says that it is difficult to account for the tremendous increase, during the last few years, of the consumption of tobacco in France; but that it has increased, and that enormously, the following figures will show:—In 1830, the value of tobacco consumed was about \$13,000,000. In 1840, it had increased to \$19,000,000. In 1850, it attained \$24,000,000, and in 1857 the sum of nearly \$35,000,000 was puffed away in smoke.

**Recent Patented Improvements.**

The following inventions have been patented this week, as will be found by referring to our List of Claims:—

**LOCOMOTIVE GRATE.**—Joseph W. Pole, of Philadelphia, Pa., has invented an improvement in the grates of locomotives, which consists in a certain construction of hollow grate bars, with provision for the admission of air to be forced through them by the movement of the locomotive for the purpose of keeping them cool.

**GAS RETORT COVER.**—With this arrangement the retort can be packed by the water in the chamber or channel round its upper edge, sufficiently tight to prevent the escape of the gas when the pressure on the same is at the proper and safe degree, but when the pressure of the gas in the retort becomes too great and dangerous, instead of an explosion occurring the gas will, by means of the perforations in the periphery of the box or cylindrical cover, exert its pressure upon the water in the channel or chamber at the upper edge of the retort and displace and spill said water over the upper edge of the chamber or channel until its level falls below the safety perforations in the periphery of the cover, when the gas will have a free escape and cease to act with a dangerous pressure upon the retort. We regard this as an excellent attachment to gas retorts for family cooking ranges and portable gas apparatus, it rendering explosions impossible. It is the invention of A. Hendrickx, of New York.

**SWITCH LAMP.**—This is a signal lamp for placing upon the switches of a railroad junction. The invention consists in placing within a lantern of proper construction, glass slides of different colors, the slides being fitted in proper guides and connected with a pendulous frame—the whole being arranged so that by operating the switch lever the colored slides will be moved or adjusted by the pendulous frame, and a light of a different color thrown from the lantern at every position of

the lever, thus indicating the position of the switch. By this invention the signal lantern is rendered self-adjusting or made to operate automatically by the movement of the switch lever, and accidents which have hitherto occurred by the negligence of the switchman in not moving the switches will be avoided, for the engineer will be able to see at once the position of a switch. S. N. Lennon, of Deposit, N. Y., is the inventor.

**PAPERMAKING MACHINE.**—Thomas Lindsay, of Westville, and Wm. Geddes, of Seymour, Conn., have invented some improvements in the Fourdrinier papermaking machine, the objects of which is to vary the width of the paper while the machine is in operation and during the process of manufacture. The invention consists in having the "lip" or basin which conducts the pulp from the endless wire apron constructed in two parts, so arranged that one part may slide over the other, and having said parts connected with the "deckles," which, as well as the "deckle straps" are, by a novel mechanism, rendered susceptible of lateral adjustment. The "deckles" determine the width of the pulp on the wire gage apron, and consequently determine the width of the paper, and as the two parts of the "lip" or basin which conducts the pulp to the apron, are connected to the "deckles" one to each, the two parts of the "lip" or basin will be removed simultaneously with the "deckles," and consequently expanded or contracted in width so as to correspond with the width or space between the "deckles." A novel way of adjusting the usual gage for distributing the pulp on the endless wire apron is also employed. These improvements have been patented in England.

**GAS REGULATOR.**—There are many gas regulators, the opening of whose valve is controlled by the pressure of the gas on an inverted cup floating in a basin of quicksilver, and this invention relates to that description. It consists in the employment, in regulators of that arrangement of a regulating valve of the form of an inverted cup, having apertures in its sides, and dipping into the quicksilver which constitutes the valve seat, this valve being applied to the outlet passage of the regulator, and so connected with the inverted cup by a lever, and the arrangement of the inlet and outlet passages being such that as the street pressure or number of burners in use varies, the valve is caused to dip more or less deeply into the quicksilver, and more or less submerge its apertures, and thus regulate the amount of opening of the valve to supply the gas at all times at a uniform pressure to the burners. The inventor is J. H. Powers, of Newark, N. J.

**MILK CLOSET.**—E. H. Nash, of Westport, Conn., has invented a new and useful milk closet or house, the object of which is to provide a cheap and portable device, one in which a large number of milk pans can be placed in as small a space as possible, and in a very expeditious manner, the device being so arranged as to allow the air to circulate freely through it, and at the same time obstruct the sun. The invention is designed for those who have but a very small dairy, too small to warrant the building of an expensive milkhouse, and also for those who at times have a supply of milk greater than can be kept in the permanent milkhouse. The inventor has assigned three-quarters of his invention to Wm. Wood, of the same place.

**IMPROVEMENT IN BRIDGES.**—This invention consists, firstly, in a certain mode of arranging and combining the string pieces or chords, the main and counter braces, tension-rods and counter tension-rods, and bearing blocks, whereby the inventor—Mr. Albert D. Briggs, of Springfield, Mass.—produces a truss frame capable of sustaining any required load with less material than is required with the common mode of arranging and combining the parts. It consists, secondly, in a certain method of increasing the bearing surface for the bearing blocks, against which the braces abut in truss frames.



Science and Art.

Interesting Geological Curiosity.

The editor of the *Eutaw Observer* was lately shown, by Dr. E. F. Bouchelle, a specimen of rock of the primitive order of formation, and of the pentedral order of crystallization, containing in its center a globule of water, movable and visible. The water is, if there be any truth in geology, one of the oldest drops of water in the universe, far more ancient than the waters of the flood of Noah. To use the language of Dr. Bouchelle, "It is a drop of the waters that covered in darkness the face of the great deep when the earth was without form and void. In other words, this little drop is a portion of the first water that was created during the six days of Genesis, and became entangled among the particles of the rock during the act or process of crystallization. The rock being primitive, or the first of creation, the water must also be primitive."

Newly Discovered Paint Deposits.

Professor De Bow recently visited the paint deposits lately discovered by Hugh White on his land near Liberty, Bedford county, Va., and furnishes the *Richmond Inquirer* with the result of his investigations, from which it appears there are the most extensive body of decomposed ochrous iron ores in the United States, if not the world. Though situated in juxtaposition with the decomposed granite in the form of porcelain—which is beautiful and abundant—and formed from the decomposition of the primitive order of silicious formation, this paint has all the features of a real pigment, pulverizes easily, contains no foreign impurities, is soft and yielding to the touch, and though oily and compressible, is entirely free from clay, and indeed has all the properties of umber, which it resembles both in character and appearance. In color it varies from a light yellow to a dark brown, as taken from the bank. The small or loose umber is the lightest, both in density and color. The flake ranges from a chrome yellow to a brown black, and when burned and properly prepared, forms the fine burnt umber of the arts, so valuable to painters and artizans generally.

The hard smooth face presented by the common paint, as taken from the mine, and simply mixed with oil, give it a valuable character as a durable fire-proof paint, well adapted to railroad cars, bridges, buildings, &c. The bank containing it is admirably situated, in regard to availability, both for transportation and mining, or preparing for market. It is near the Virginia and Tennessee Railroad, and situated on the side of a hill, from which the water drains naturally. The paint in the crude form, as it comes from the mines is well adapted to all common purposes, and is said to be much superior, both in appearance and utility, to Blake's paint, with which most of our readers are acquainted. We have no doubt but that this deposit will prove valuable to the owner, and of much utility to the community, since a good and cheap domestic article of paint is a desideratum of much importance.

Improved Bolting Reel.

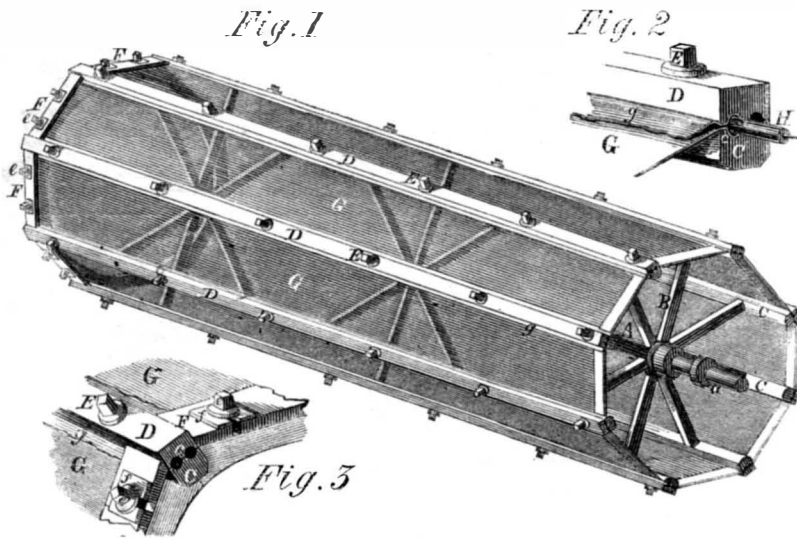
The method usually pursued in attaching bolting cloths to reels is clumsy and inefficient, being by means of tacks, which tear the cloth, and will never keep it at the same tension or tightness all around the bolt. It is extremely troublesome to remove, and should any portion get torn or damaged it cannot well be repaired, so the millers usually paste up the hole, which helps to clog the bolt, and prevent its perfect action. The method of attaching cloths to reels, which is the subject of our illustration, is the invention of John Woodville, of Chillicothe, Ohio, and was patented by him April 21, 1857.

Fig. 1 is a perspective view of a bolt, A being the central axle, with journals, a, on which it can rest, and from the axle projects two or more sets of radial arms, B, that carry

the slats, C, which run parallel with the axle from the reel. Each of these slats, C, has two semi-circular grooves in it, c, and there fits on the top of each of them another slat, D, having corresponding semi-circular grooves; C and D, being secured together by square headed screws, E. At one end of the bolt, plates, F, pass between the slats, giving rigidity to the reel, and helping to hold the cloth

(seen in Fig. 3). They are attached to a rim with which that end of the reel is provided, by screws, e, passing through a slot in the metal plate, f, that is on the wooden plate or piece, F. G are the cloths, each of which, whether of silk or fine wire gauze, should be bound with canvas to protect the edges and ends. The canvas of one of the long sides is stitched round an iron or other rod, which,

WOODVILLE'S BOLTING REEL.



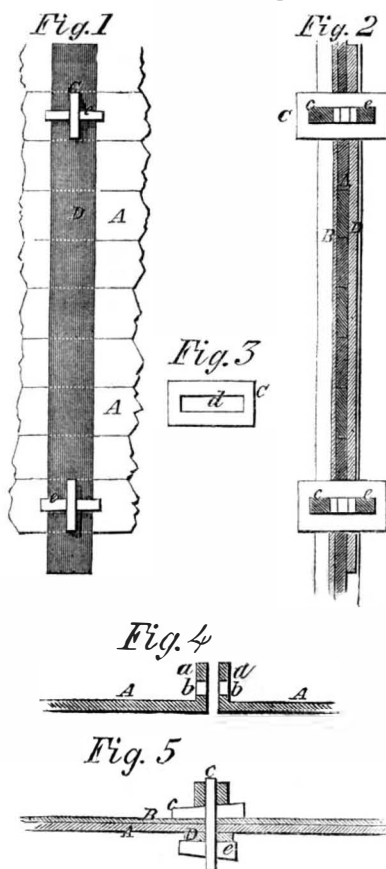
being inserted into the semi-circular groove in C, and the plate, D, screwed down tight over it, holds the bolting cloth perfectly rigid at one side. The other side is now passed round a loose rod, H (seen in Fig. 2), which is placed in the nearest groove, c, of the next slat, and the cloth being pulled tight round it, the slat, D, (having first a side of another cloth placed in its other groove,) is partly screwed down, and the cloth can be pulled to any desired tension by the projecting slip, g; but when D is once thoroughly screwed tight

it will not move. The ends are now pulled "taut," and the piece, F, secured, and the bolting cloth is fixed. In this way the whole reel is quickly made up.

This system has been in use some time, and has fully answered the inventors' expectations, giving, by the evenness of its surface, a superior bolting reel, and being easily repaired, cleaned, or adjusted. We recommend it to the notice of every miller.

Any more particulars can be obtained from the inventor, as above.

McKibbin's Method of Securing Metal Bars.



Great difficulty has been experienced in securing the ends of bars firmly together when arranged on the same line with each other, in the construction of bridges and other structures, and the object of this invention is to provide a simple and effective plan for accomplishing this object. It consists in a novel and very simple method of clamping and securing the ends of metal bars, and uniting plates with the said bars, by which great strength is obtained. The invention is applicable, in almost all cases where it is required to connect the ends of iron bars.

In our illustrations, Fig. 1 represents this contrivance applied to a portion of an iron bridge girder; Fig. 2 is a vertical transverse section of ditto; Fig. 3 is a view of the slotted plates between the bars; Fig. 4 is a horizontal section of the ends of two bars nearly brought together; and Fig. 5 is a horizontal section of ditto connected. Similar letters refer to like parts.

A are a series of flat horizontal iron bars, arranged edgewise one above the other, and united to form part of the bridge girder. B is a plate iron sheathing, covering one side of the said series of bars. As the bars, A, extend the whole length of the bridge, they have to be composed of several lengths or sections united at their ends, and the mode in which these lengths or sections are united constitute the invention. The ends of the bars, A, are bent at right angles to form lugs, a a, in which are formed narrow slots, b b, to receive a wedge or key, c. Between the lugs, a a, of two lengths of bar iron, is fitted a plate, C, whose width is the same as the width of the bars, A A, and in which is formed a slot, d, of the proper width to receive the wedge or key, c. A vertical iron plate, D, is placed against the opposite side of the joint to that from which the lugs, a a, project, and this plate, D, contains slots for the plate, C, to pass through. When the plate, C, is placed between the lugs, a a, and the plate, D, applied, the wedge or key, c, is inserted through the slots, b b and d, of the lugs, a a, and plate, C, and a wedge, e, is inserted in the slot, d, outside of the plate, and when both wedges are driven tight, the joint between the two lengths of bars, A A, is secure.

The sheathing, B, when used, is simply applied close to the bars, A, on either side, holes being provided in the sheathing for the plates, C C, or for said plates and lugs, a a, to pass through, according to the side on which the sheathing is placed. When a series of several bars are to be combined, by arranging them together endwise, the plates, D, are to be long enough to lay across the end of the

whole series of said bars, and to serve for two joints; but if a single line of bars only are intended to be united, these plates, D, need only be long enough to cover one joint.

This simple combination of parts to accomplish a very desirable end was patented on the 9th of March, 1858. Any further information can be obtained by addressing the patentee, William McKibbin, San Francisco, Cal.

News from the Bells.

The new Victoria bell, which is "Big Ben" re-cast, and is intended for the British Houses of Parliament, weighs 13 tons, 10 cwt., 1 qr., 12 lbs., or rather more than 2 tons less than the original. Its diameter is 9 feet, and height 7 feet 6 inches. The church of Bon Secours, at Rouen, France, is about to be supplied with a chime with all the modern improvements; the chimes are to play special airs on saints' and holy days, and to have a finger-board, so that any musician can make them discourse eloquent music.

Vacancy in the Patent Office.

In our last number a paragraph appeared with the above caption, which, owing to a misapprehension on the writer's part, was not altogether correct, and does one of the ablest Examiners which the Patent Office now possesses—Dr. King—a slight injustice. Soon after the removal of Dr. Everett from the Patent Office, Dr. King was appointed to fill his place, which comprises inventions almost as diffused as air or carbonic acid. Willing and talented as Dr. King is, he is not quite equal to a labor of Hercules, and this is the reason why so many inventions in the steam engine department have had to wait a long while for their examination, together with the fact that such a great number of inventions come within this class.



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