RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Iron-clad and Other Vessels.—This invention consists in the application to a vessel of a hinged adjustable shifting keel connected to the main keel and operated by chains or other suitable means in such a manner that it can be turned down to a perpendicular position whenever it may be desirable to increase the steadiness of the vessel, or that it can be turned up on the side of the main keel if the latter is deemed sufficient to keep the vessel steady. The invention relates also to certain improvements in the gear for operating the turret, also to a certain novel arrangement for operating steam rams and scuttling rams or augers extending through the sides of the vessel and calculated to produce holes in a hostile vessel, either by blows or by boring such holes, as may be most convenient. Charles Slater, Brooklyn, N. Y., is the inventor.

Printing Press.—This invention relates to a new and improved printing press for general use, but more especially designed for printing labels or small bills, etc. The object of the invention is to obtain a press of simple construction by which any person can do his own printing in a small way. Druggists, for instance, print their own labels, storekeepers their own circulars, bill-heads, etc., etc. The invention will prove valuable in those cases where dates are put on labels, and consequently require to be changed every day, and where the titles on labels are frequently changed. Henry Redlich, Chicago, Ill., is the inventor.

Ore Separator.—This invention relates to a new and improved device for separating the heavier masses of ore from the lighter portion or "slime" as it is technically termed, and it consists in the employment or use of a hopper provided with a deflecting board and a chute, and also provided with an exit chamber having a pipe or tube communicating with it and provided with faucets or plugs, all arranged in such a manner as to effect a complete separation of the two parts of the ore specified. James Watson, Cliff Mine, Mich., is the inventor.

Composition for Preparing Ribbons for Hand Stamps, Etc.—In certain classes of hand stamps ink-prepared ribbons are used, which are drawn through between the die and the bed, and give the impression when the die is depressed. For the purpose of preparing these ribbons ordinary printing ink has been used in the absence of some better composition, and a ribbon thus prepared will give about thirty impressions on the same spot. The composition which forms the subject matter of this invention, and the coloring base of which is one of the aniline colors, when properly mixed and applied to the ribbon allows of taking more than a hundred impressions from the same spot; in fact, the color seems to be inexhaustible, and is, therefore, of great value for the purpose above stated. Horace Holt, No. 264 Broadway, is the inventor.

Oil Press.—This invention consists in the use of doors sliding in grooves in the adjoining movable sides of the press boxes, said grooves being arranged in such a manner that they retain the slides firmly in position, and compel them to close tight when the press is filled, and at the same time they do not interfere with the sliding motion of the sides of the press boxes. The invention consists also in the application of a steam supply and of an exhaust pipe, extending over the entire length of the press, and communicating with each press box by small pipes, in such a manner that said small pipes will have sufficient spring to allow the sides of the press boxes being moved the requisite distance, and all complicated joints in thin pipes can be avoided. Wm. V. McKenzie, Jersey City, N. J., is the inventor.

Circular Cutter.—The object of this invention is to cut out circular disks or rings of india-rubber or other material, such as is used for the packing of flanges and other circular parts of steam engines and other machines. To effect this purpose a movable knife holder is secured to a rod provided with a rule and with a screw handle, and fixed center, in such a manner that the knife can be readily adjusted to any desired distance from the fixed center. By turning the handle the knife holder can be released or fastened at any desired point on the rule. The fixed center is secured in a stationary head provided with a swiveling arm rest, in such a manner that the operator is enabled to press the fixed center down with his arm, and take hold and operate the knife with the hand, while his other hand is free to hold the material and move it against the knife, and the cutting operation will be executed in a short time with care, and with perfect exactness. Emil Hubner, New York city, is the inventor.

Fire-arm.—This invention consists, among other things, in forming the lock frame and the guard in one piece, and in so connecting the frame to the receiver as to be removable by the withdrawal of the pin on which it rotates; also in a novel method of forming the shell drawer for withdrawing the empty shell of the cartridge, and in other devices and modes of operation which are considered to be valuable improvements in breech-loading fire-arms. The patent bears date April 18, 1865. Albert M. White, Port Chester, Westchester Co., N. Y., is the inventor.

BOOKS AND PUBLICATIONS.

ATLANTIC MONTHLY.—The May number of this standard periodical has a leading article upon birds of America, which, in a discursive and genial way, tells us all about our feathered friends—those familiar to us from constant flitting about our houses, and those afar off who haunt the woodside or the depths of the forest. Every lover of nature will read the article with pleasure. The poetry of the May number is not remarkable for depth, feeling, or originality of thought—"Gold Egg; a phantasy," being as fantastical in meter as it is vague and misty in purpose. "Out of the Sea" is a local romance, with a vigorous, fresh life and tone, and other tales, together with Mrs. Stowe's always welcome and popular, because sensible, articles on topics of everyday interest, make this number a most entertaining one. Sold by all booksellers and newsdealers.

GAZLAY'S PACIFIC MONTHLY.—This magazine is a new comer in the field of periodical literature. It is intended for circulation in California principally, and has articles bearing upon topics interesting to the people of that State. It is printed very handsomely, and is published in New York at No. 34 Liberty street.

DEMOREST'S MONTHLY MIRROR OF FASHIONS.—This magazine is chiefly valuable for the attractions it presents to modistes and housekeepers generally in the very elaborate set of paper patterns which accompany each number, and which would cost if bought on Broadway more than the price of a year's subscription. By consulting this periodical our readers in remote towns can have the earliest fashions brought to their firesides. In addition, there are recipes for cooking which are also valuable to those who consider taste any object in culinary matters. Published by W. I. Demorest, New York.

The Russian Epidemic.

There seems to be no occasion for alarm in regard to the epidemic prevailing in Russia. In the French Academy of Medicine it is declared to be typhus fever, a disease wholly unknown in this country except among crowds of foreigners just landed from emigrant ships. Our common typhoid fever is so named because it resembles the typhus in some of its symptoms, but it is an entirely distinct disease, characterized by ulceration of the bowels. Dr. Murchison, physician to the London Fever Hospital, writes to the *London Times* this full account of the Russian epidemic:—

If the details furnished by foreign physicians are to be relied on, it is not a new pest which has invaded the world, nor has the disease any relation whatever to Asiatic cholera. The malady is evidently relapsing fever, which, under different designations, has been well known in Britain and Ireland for nearly two centuries, which constituted a great part of the Irish epidemic of 1847, and which about the same time was very prevalent in Upper Silesia and in other parts of Germany. The Russian disease corresponds with relapsing fever in every particular save one—viz., its great fatality; but this difference is apparent rather than real, and is attributable to an admixture of ordinary typhus. The mortality from relapsing fever has rarely exceeded three per cent; but almost all epidemics of relapsing fever have coexisted with epidemics of typhus, of which the average mortality is nearly 20 per cent. Hence the aggregate mortality of an epidemic of the two diseases varies with the proportion of typhus. One peculiarity of relapsing fever is that it prevails in great epidemics, and then entirely disappears for years. In 1851 more cases of relapsing fever were admitted into the London Fever Hospital than of any other fever, but for upward of ten years not one case has been observed. The intervals between some of the epidemics have been so long that time has been afforded for a new generation of medical men to spring up having no experience of the disease, and who, on the occasion of a fresh outbreak, have imagined that they were encountering a new malady. So it was in Scotland in 1843, and so it is now in the case of the Russian epidemic. The causes assigned for the Russian epidemic are the crowding into St. Petersburg of 43,000 laborers in search of work, but more particularly the unusual destitution among the poor, and their recourse to unwholesome food, such as bread containing a large quantity of horned rye. The epidemic, we are told, is "exclusively confined to the poorer classes." In this respect the relapsing fever of Russia is not singular. In this country the disease has always been confined to the poorer classes.

The Way Tar is Obtained.

In compliance with the request of a correspondent we publish this description of the process of procuring tar, which we take from an article on the subject in Appleton's New American Cyclopædia:—

Tar, a thick, black, viscid material, a product of the destructive distillation of carbonaceous substances, as wood, peat, bituminous coals and shales. It is a commercial article, largely produced, and applied to a variety of uses. It was known to the ancient Greeks, and Dr. Clarke, who describes the method of manufacturing it in the forests of Bothnia, states that there is not the smallest difference between the processes there practiced and those of ancient Greece. Along the whole coast of the Gulf of Bothnia the inhabitants are very generally engaged in this occupation. They make use of the roots of the fir trees, with logs and billets of the same, which they arrange in a stack of conical shape, fitted to a cavity in the ground, generally made in the side of a bank. In the bottom of this cavity is placed a cast-iron pan from which a spout leads out through the bank. The heap is covered over with turf, and is then fired, as in making charcoal. Tar collects in the latter part of the process of charring, and runs off through the spout into barrels placed to receive it. Tar is a product, where charcoal is the chief object of the process, but is seldom obtained in quantities sufficient to render it an object to collect it, except in charring the resinous woods of the pine family. In Sweden, where the business is also an important one, some peculiar methods are adopted to increase the yield of tar in wood. Trees of no value for the saw-mill are partially peeled of their bark a fathom or two up from the ground, not enough to kill them, but only to check their growth. After five or six years, when cut down, the wood is found to be much richer in resinous matters which produce tar. It is noticed that the condition of the weather during the process of charring may make a difference of 15 or 20 per cent in the yield of tar. In the United States tar is produced in almost all parts of the country where pitch pine and the *pinus australis* are found. Along the coast of the Southern States, especially of North Carolina, Virginia, and Georgia, the business has been carried on upon a large scale in connection with the manufacture of turpentine, rosin, and pitch. Old trees, which have ceased to produce turpentine, and dead wood which is rich in resinous matter, are selected for the coal pits. The process does not materially differ from that already described.

VEGETABLE ORIGIN OF DIAMONDS.—Prof. Gœppert, who recently obtained the prize offered by the Dutch Scientific Society for an essay on this subject says:—"In my essay I have given ample proof that at one time diamonds were soft bodies. I have not yet attained any results with respect to graphite, but in diamonds I have found numerous foreign bodies inclosed, of which, if they cannot be said to be evidently and undoubtedly vegetable in their origin, it would, on the other hand, be difficult to deny their vegetable nature altogether."—*Seemann's Journal of Botany.*

MM. MOUTIER and DIETZENBACHER have been investigating the modifications of the physical properties of sulphur which are produced by minute quantities of carbon. They find that sulphur, when heated to 270 deg., in contact with carbon, absorbs about one-tenth per cent of that body, and is thereby rendered soft and plastic. Minute quantities of iodine, and of several other bodies, are similarly absorbed by sulphur, and similarly modify its properties.

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Improved Parallel Ruler.

In mechanical drawing parallel rulers are indispensable, and, as the inventor of the one here shown says, the ordinary one is very defective. When opened they continually move to one side and from the work, which is inconvenient. They are likewise liable to become untrue, for if the connecting bars are not hinged at the same angle, or if one joint gets worn more than the other, the lines will not be parallel.

The engraving represents a new parallel ruler which is a very desirable improvement, and a useful addition to the draughtsman's case. It may be moved in parallel lines directly from the operator, by simply working the pinions, A and B, which mesh in appropriate racks, said racks being fixed to crossp.eces dovetailed to the rulers themselves. The toggle-jointed bars, C, cause the rulers to move in either direction, as before explained, and by the number of joints the wear of each individual one is lessened, so that greater durability is combined with efficiency in this instrument. It is also light and free from sharp points liable to stick in the paper and mar the drawing. A patent was procured on this invention through the Scientific American Patent Agency on the 14th of February, 1865, by E. C. Gillette, of San Francisco, Cal., temporarily residing in Richfield, British Columbia. For further information address Henry Lyon, No. 119 Nassau street, New York.

Fig. 1

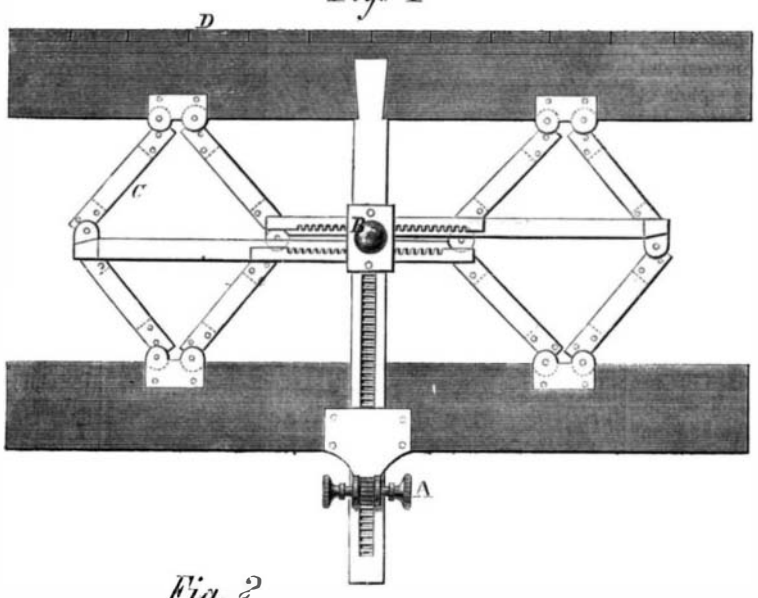
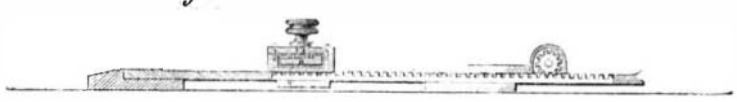


Fig. 2



GILLETTE'S PARALLEL RULER.

Drainage Works of London.

On the 4th of April last there was a celebration in London on account of the opening of the main drainage works of that city, by which the Thames river is to be purified or relieved of the refuse matter of the city which has been poured into that stream. The London *Times* gives a very extended account of these works.

The river runs through the center of the city, which stands on the north and south sides of it, and receives all its drainage. It is desired to intercept this matter before it reaches the stream, and the contents of the sewers carried off in another direction. It became necessary to construct certain main sewers of great length and capacity to receive this refuse. There are three great main lines of sewers, or rather tunnels, which run from the extreme west to the extreme east of the metropolis, and which are laid at angles to all existing sewers and a little below their levels, so as to intercept their contents and convey them to an outfall 14 miles below London bridge. As large a proportion of the sewage as practicable is by this means carried away by gravitation, and for the remainder a constant discharge is effected by pumping. At the outlets the sewage is delivered into reservoirs situated on the banks of the Thames, and placed at such a level as will enable them to discharge into the river at or about the time of high water. By this arrangement the sewage is not only at once diluted by the large volume of water in the Thames at high water, but is also carried by the ebb tide to a point in the river 26 miles below London bridge, and its return by the flowing flood tide within the metropolitan area is effectually prevented. The work required the highest engineering skill. Tunnels have been carried under railways, streets, water-courses and highways. Foundations have been laid in all varieties of shifting ground, from peat to quicksand. One whole mile of tunnel was driven under the town of Woolwich. The ordinary drains of the metropolis are, in the aggregate, about 1,300 miles in length, and it required 82 miles of main sewers to intercept their contents from the Thames. The cost of the work has been £4,000,000. Six-sevenths of it has been completed, and London is now the best drained city in the world. The improved health of the city already attests the importance of the work.

The recent demand for black and white muslins caused an advance of 15 per cent.

Malleable Cast Iron.

On the 3d of April, Mr. Zerah Colburn read a paper before the Society of Engineers in England on certain methods of treating cast iron. We extract the portion in relation to making castings malleable:—

"The next point to be considered is the treatment for making castings malleable. I should have said nothing of this were it not that, although exceedingly simple, it is but very little understood, for it is a very common notion that many and curious 'chemicals' are required, and that there is much mystery in the process. Making iron malleable was, indeed, among the lost arts, and old records show that it was lost and rediscovered more than once. The French philosopher Reaumur, who wrote upon it 140 years ago, observed that it was then practiced as a great mystery in Paris. At last chemistry came to the aid of the metal worker, and he learned that what he had so long called sulphur in the iron—and sulphur was once a name applied to many substances—was really carbon, the same as charcoal or diamond. And chemistry showed how carbon would always forsake iron for oxygen, and that cast iron, treated with oxygen, was made malleable, as it always is, whether in the old refinery fire, in puddling, in pig boiling with forge scales and refinery cinder, in the Bessemer process, and in still other modes of treatment. In 1804, Samuel Lucas, of Sheffield, turned his knowledge practically to account. He took out his patent, too, and described his improvement very clearly; and, to put it in the fewest words, it was nothing more than the present process of making castings malleable by roasting them, at a high heat, from 72 to 120 hours in powdered hematite iron ore, or in any metallic oxide. The oxygen of the ore unites with the carbon in the iron casting, which, being thus left without carbon, becomes malleable—malleable, indeed, to a remarkable degree. It is commonly said that castings intended to be malleableized should be from very hard, brittle iron. It is not exactly because a casting is brittle that it is of the best sort for the malleable iron treatment, but brittle castings contain less carbon than those from gray iron, and so the malleable process does not have to be so long continued to get rid of it. To those who are not accustomed to consider all forms of iron and steel as combinations merely of iron and carbon in different proportions, there is something a little paradoxical in the fact that a gray iron containing much carbon is tough; a white iron, containing less carbon is brittle; while wrought iron, containing but little carbon, is very tough. Even to a chemist these facts are not easy to be explained; nor shall I examine them further here, it being sufficient merely to have shown why a white and brittle cast iron, such as some of the Ulverstone iron of which clock bells are made, is the best for the malleable iron process, because it contains less carbon than a gray iron. The castings must be packed perfectly air-tight in layers of powdered ore, and shut up in cast-iron boxes, of which the joints should be luted. The natural ore used for purifying gas at the various stations of the Chartered Gas Works would, no doubt, answer very well for malleable castings, although it cannot be said whether Mr. Hill's oxide would do as well. The goods should be heated very gradually, twenty-four hours being occupied in getting up, and twenty-four hours more in letting down the heat, beside the two or three days at full heat. The heat should be very even over all parts of the goods, and while the full heat is on it should be kept constant by careful firing and attention to the draft. The iron ore may possibly fuze upon the surface of the casting, thus covering it with lumps or warts; but this is the result of too high a heat, or of access of air. Oxide of zinc, which is abundant in some parts of America—as near New York—is preferable to iron ore, but those who cannot obtain the former can get on very well with the latter. The agricultural implement makers have turned the properties of malleable cast iron to good account for the tines of their cultivators. At the large works of my friends, Messrs. Howards, of Bedford, unusually large pieces are made malleable by roasting in hematite ore. McHaffie's malleable castings—and for which it is generally supposed that there is a patent, although I believe there is none—are no doubt made in much the manner described, as also, no doubt, are Crowley's, of Sheffield, although different makers add various chemical substances, which may act in the same manner as the iron ore, and thus, to a certain extent, replace it, although it is doubtful if they greatly promote its real action.

Wherever a shape can be easily made in wrought iron this is probably cheaper than a malleable casting, and it is doubtful, therefore, whether the latter will ever be extensively used. It may be added that the tensile strength of malleable castings varies according to their size, and the depth to which the decarburization extends. If they were freed of their carbon all the way through, they would be converted into wrought iron, or, say, 'homogeneous metal,' as the softest kind of steel has been called. So much of the casting, however, as is not decarbonized by the malleable iron treatment remains cast iron, and has only the strength of cast iron. The effect of the process is generally visible for only a small depth below the surface, but small malleable iron castings have borne a tensile strain of 50,000 pounds per square inch."

Velocity of Liquids Through Siphons.

John Galletly has published the results of some very interesting experiments on the rate at which different liquids flow through siphons. No two liquids flow at the same rate through siphons of the same dimensions—the periods required, for example, to draw off water, ether, bisulphide of carbon, and whisky of 914 deg. specific gravity, from a vial holding a little over four ounces, through a siphon of somewhat narrow quill tubing; being, respectively, seventy-four, forty-eight, forty-seven, and one hundred and eighty-two seconds. The same liquids flows at different rates through siphons of different diameters of bore, or of different lengths of limb, but the degree in which the rate of efflux through a siphon of given dimensions varies from the rate of efflux through a siphon of other dimensions, is far from being the same for all liquids. Mr. Galletly gives the results of three sets of experiments, in all of which the bottle employed was one capable of holding just 7,300 grains of water, and was four and a half inches deep, while the siphon used was a little over one-

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seventh of an inch in diameter of bore. In the first set of experiments the long limb of the siphon was eighteen and a half inches, in the second set of experiments nine inches and three-eighths, and in the third set of experiments only one quarter of an inch, longer than the short limb. The results of the three sets of experiments are embodied in the following table :—

Having so adjusted the lengths of the long limbs of siphons of different diameters as to cause them to empty a bottle of water in equal times, Mr. Galletly tried whether other liquids would also flow through them in equal times, and found that no other liquids would do so. He also experimented with long and short siphons, exactly alike in diameter of bore, and with the extremities of their limbs kept in each case at the same relative levels. The following table shows the results of two expements, the first with a siphon of which both limbs were about nineteen and a half inches long, and the second with a siphon of which both limbs were nine and a quarter inches long. Both siphons were of precisely the same diameter of bore, and in both experiments the extremity of the limb of the siphon placed outside the bottle,—which was the one already mentioned as holding 7,300 grains of water,—was kept just three-eighths of an inch lower than the extremity of the other limb.

Mr. Galletly concludes his paper with an example which suggests that their respective rates of efflux through siphons may be used to distinguish one liquid from another. He filled the bottle used in the experiments already quoted with paraffine oil of 797 deg. specific gravity (water=1,000), and found that drawing off this oil by means of the siphon used in the third of the three sets of experiments referred to in the first of the two tables given above, occupied 286 seconds. He then re-filled the bottle, this time with petroleum, of precisely the same specific gravity as the paraffine oil used in the preceding experiment, and found that for drawing off this petroleum by means of the same siphon 375 seconds were required. These facts point to the possibility of valuable practical tests of the purity, etc., of various liquids being based upon the phenomena to which Mr. Galletly has called attention. Is it not curious to consider how intensely individual the phenomena in question, together with those of spectrum-analyses, of the formation of cohesion-figures, etc., etc., show every substance in nature to be, in regard to every one, even the most seemingly insignificant, of its properties?

Steam Carriages in France.

"From the *Journal de Loir et Cher*, we learn," says the *Mechanics' Magazine*, "that a joint stock company has been formed at Blois for running stage coaches from that city to the principal towns in the department. The coaches are to be drawn by steam engines on the ordinary roads, according to the system of Mr. Lotz, an engineer residing at Nantes. The first coaches established will run between Blois, Romorantin, Selles sur Cher, St. Agnan, and Montrichard. Ten miles an hour, stoppages included, is the rate at which it is stated they will travel."

[These road locomotives will not run long. It is an old saying that one man may lead a horse to the water, but twenty can't make him drink. Engineers are able to construct machines to run by steam on common roads, but if the public won't patronize them, what is to be done? It is not a question of mechanical ingenuity, for that is already settled, but one of the popular taste, which no blatant arguments or hobby riding can overcome.—Eds.

Trades Represented in the English Army.

A return, recently issued, shows the number of non-commissioned officers and men in every regiment at home who have learned some trade before enlisting, and of the number who have worked at their trade since they entered the army. The largest number are shoemakers, of whom there were 3,279 enlisted, and 1,197 have practiced their trade since enlisting. The smiths are not far behind them, 2,732 of these having enlisted, and 1,083 afterward practiced their trade. It is a sign of the times that 2,756 weavers are among the enlisted men; only three of them have practiced their trade since entering the army. There were also among them 2,151 tailors, 2,053 carpenters, 1,289 bakers, 984 painters, 973 masons, 855 butchers, 813 bricklayers, 556 gardeners, and 546 printers.

OYSTON'S STREAM-SPREADING NOZZLE.

This invention is designed to spread the stream of water issuing from the pipe of a line of hose, so that said stream would cover a larger area and be more efficient in extinguishing a conflagration than a straight jet; to effect this object the inventor constructs a cup shaped vessel, A, which is attached to the end of a nozzle, said vessel having a number of levers jointed at the middle, and so operated by the revolving cap, C, that they assume different positions, affecting the nature of the stream issuing from the mouth of the vessel, so as to change the character of it with each alteration in the position of the levers. These levers can be thrown entirely clear of the stream as shown by the dotted lines, so that a straight

jet will be projected; or by partially rotating the cap C, four of the levers will be first thrown in toward the center as at, D, and by continuing the rotation the other four will be forced entirely in so that all radiate from a common center, thus changing the stream issuing from the nozzle into a mist or spray which is said by the inventor to be more effectual in extinguishing fires than a solid column.

The figure holding the pipe and the several streams shown issuing therefrom explain the idea of the inventor very clearly.

The above article may be seen at the office of Cornish & Congden, 179 Broadway, up stairs, New York. A public exhibition of it will be given in this city in a few days, of which notice will be given in the daily papers. The inventor desires to call the attention of insurance Companies and all persons interested in saving property from fire to this improved pipe, which was patented through Scientific American Patent Agency, on Aug 25th, 1863, by Charles Oyston of Little Falls N. Y. for further information address him as above.

CASTOR-OIL beans are said to be a most profitable crop to grow, being worth at the present time $2 50 per bushel, with small prospect of a decline.

Experience with Bessemer Metal.

We make the following extracts from an editorial in the London *Engineer*, of March 31st:—

RAILROAD RAILS.

We are in a position to give some particulars as to the results already attained in the use of Bessemer metal for rails, ships' plates, etc., and these, it will be seen, are such as to leave no doubt of the vast importance of this material for the purposes of the engineer and constructor. In the year 1861 the London and North-Western Railway Company purchased 500 tuns of rail blooms from Messrs. Bessemer and Co., and when rolled into rails one of these, taken at random, was put down in a part of the line near Camden Town, where the traffic was unusually heavy. The wear of the contiguous iron rails and that of the steel rail was carefully noted by order of the Board of Directors. On the application, in 1864, of a gentleman interested in the subject, the following particulars were kindly furnished him:—The rail was laid down May 9th, 1862, and when examined in September, 1864, "there were little signs of wear." 8,000 goods trucks pass over this rail in twenty-four hours, and it is estimated that 7,000,000 trucks passed over it in the two years and four months covered by the report. The neighboring iron rail, also put down new on the 9th of May, 1862, was turned in July; new rail September 9th, 1862, turned November 6th; new rail January 6th, 1863, turned March 1st; new rail April 29th, turned July 3rd; new rail September 29th, turned December 16th; new rail February 16th, 1864, turned April 12th; new rail August 6th, still down at the date of the report. So the Bessemer rail had nearly worn out both sides of seven rails. The steel rail, it is since understood, is still in use, in good condition, and without having been turned. Here if ordinary rails are worth £7 per tun, the Bessemer rail would be worth very much more than £50. The traffic through the Crewe station is, it is well known, very great. Formerly the iron rails were worn out there in four months, each side of the rail giving two months' wear. The station was laid throughout, November 10th, 1861, with steel rails rolled by the company from ingots made by Messrs. Bessemer and Co. None of these rails have yet been turned, and it is understood that they appear likely to go two years more before even the first face is worn out. Here the comparison with iron would appear to be something like twenty or more to one.

SHIPS' PLATES.

In the case of ships' plates, Messrs. Jones, Quiggin & Co., of Liverpool, employed Bessemer cast-steel almost exclusively in their ships built in 1864, and they have used large quantities of it since 1860. This firm last year launched twelve sailing ships and eleven steamers, the frames of which were of puddled steel and the plates of Bessemer cast-steel. The plates are, on the average, five-eighths as heavy as iron used in like vessels, the saving in weight being, of course, added to the useful burden of the vessel on a given draught. Among the steamers will be recognised the names of the well-known blockade runners:—the *Colonel Lamb* and *Hope*, each 281ft. long, with 350-horse engines; the *Rasine* and *Raiby*, 260ft. long, with 300-horse engines; the *Cora Bellt*, *Wasp* and *Hornet*, each 250ft. long, with 220-horse engines; and the *Lynx*, *Fox*, *Bat* and *Owl*, varying from 532 to 771 tuns.

FINE TOOLS.

Messrs. Benjamin Hick & Sons, of Bolton, employed Bessemer tool steel in their works for some years, and, we believe, are still using it of their own make—they having become licensees some time since.

RAILWAY TIRES.

Railway tires thus far made of Bessemer metal have not, heretofore, been generally made out of a solid block, but in a bar or bars, afterwards welded together. There is no cast-steel tire whatever that can be depended upon if completed by welding, and several Bessemer tires thus made have failed in the weld. Among these were a considerable number of engine tires supplied to the London and South-Western Railway. But the fault was not that of the material, and we feel no risk in saying that Krupp's tires, excellent as they unquestionably are, would, had they been welded, have failed in the same manner. Krupp's tires are made from a solid block of oblong shape, and through which a slot is made by drilling and cutting, this slot being afterwards opened out so as to

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