

if you have been in the habit of using a poker, trade it off for a hoe. Next fire as usual, and, if it is not raining too hard, go out and take a look at the top of the chimney. It is bound to be smoking. Now with the hoe push all the burning coal a little back, so as to leave a foot of the front end of the grate bars uncovered. Now throw in fresh coal on this clear part, quite a lot of it. It will now burn from its inner edge, which becomes coked, the escaping gases passing over the glowing coal further in the furnace. The process of firing consists in pushing these coked portions back into the fire, and putting fresh coal on the side of the heap nearest to you. You will notice that by this plan of firing you never put any coal into the fire at all, but into what may be called a coking oven, and you burn only coke. All coals, clinker, etc., are moved inward, and as a consequence the clinker will all have to be taken out at the back end of the grates. For this purpose a door in the side wall, level with and at the back end of the grate, will be found more convenient than engineering the clinkers around to the front door again. This method of firing is almost universal in England, where municipal law fines a smoking chimney. One objection to the process is that the charges of fuel, being light, must be pushed forward frequently, keeping the furnace door open a great deal. Notwithstanding this fact, the plan will be found very satisfactory.

SHAFTING, HANGERS, AND PULLEYS.

"Dixon has recently been replacing one of his line shafts. He has been telling me for the last two years that the thing was annoying him. He has made a clean sweep this time, and I hope he is now at peace. He bought that shaft, with its hangers, couplings, and pulleys, in Boston when he first started his shop. It was his main line then. It was only one and fifteen sixteenths in diameter, and the pulleys had wretchedly gotten-up set screws in them. He says he bought the stuff with his eyes shut, and I believe him. About a year ago the receiving pulley on this shaft slipped a little and gouged a couple of rings in the shaft. Last month the shaft twisted off at that place, which is the best thing that ever happened to it, for it made Dixon mad and he superannuated the whole thing. Even the pulleys he laid aside for other purposes. The hangers, when lying on the floor, look as though they had a world of drop, but in reality it was only ten inches, and they had been put up with nine inch wooden blocks to lower them. They had a fearful lot of metal in them, for they dropped about two feet and then turned up again. That's what made them look so imposing when on the floor. They were fancy-looking affairs, all the orders of architecture having been called into play in their design. Dixon threw them in his scrap pile. The shafting was not at all nice, being very irregular, and the pulleys were poor fits. The couplings were of the modern taper sleeve variety, and looked first class in every way, but were always troublesome. They were all right when the shaft was in perfect line, and they were all right when the shaft was very much out of line, as was the case once when a new Daniels planer was put in the pattern shop above. But when the shaft was just a little out of line, as most shafts are, those couplings would squeak and "chaw" the shaft, and work off. Nothing could be done for them but lining up the shaft, which seemed to be the only thing which ought to be done; but the floor above was not substantial, and it would disarrange the shaft in a very short time. In putting up his new shaft, Dixon has stiffened this floor as much as possible, and put up hangers with twenty inches drop, with solid cast iron boxes and glass oilers. The old boxes were self oilers, but gave trouble. He has enlarged a portion of this shaft, as ought to have been done at first, and put on all the pulleys in halves. He says it cost him fifteen dollars every time he put a new pulley on the old shaft, or changed the order of hose already on. He has put on the ancient style of flange coupling, which looks very much like retrogression; but my own experience has been about like Dixon's, and I expect I should have done about the same thing. His couplings are provided with an outer sleeve a foot long, which covers the bolts. Without these sleeves I believe these flange couplings to be the most murderous pieces of metal about a shop. His pulleys are the neatest I have ever seen. Most of these two-part pulleys look very clumsy.

SELF-OILING BOXES.

"Speaking of self-oiling boxes, I was told of a Cincinnati firm who sold a complete mill outfit, with all boxes on the self-oiling plan. The customer reported trouble with the boxes, and further inquiry elicited the fact that no oil whatever had been supplied to them at the trial start. The self oiling feature had been depended on for supply as well as regulation."

LEFTWICK.

THE FAIR OF THE AMERICAN INSTITUTE.

Despite the existence of the Centennial Exposition, the present Fair of the American Institute is likely to be as interesting, in point of novelties displayed, as any of its late predecessors. The same, we think, will be found true of other local exhibitions. Both from the size of the Centennial and from the limited time which most visitors thereto have at their disposal, to the foreign exhibits is given the greatest share of attention; and many home contributions, which in smaller collections would be narrowly scrutinized, are there overlooked, or at least but cursorily examined. Local fairs, therefore, viewed as domestic advertising mediums, really offer superior advantages to the great international display; and the recognition of this fact, by manufacturers and others, doubtless accounts for the non-diminution of the usual number of entries in the American Institute building. On the part of the Fair managers, it is evident

that exertions have been made to render the show more attractive, both to exhibitors and to the public. New decorations, quite tasteful in their way, a new and handsome fountain, an attractive-looking, though poorly stocked, Japanese bazaar, and various other improvements have been added. The general arrangement of the hall, however, is the same as during former years; and we can dispose at once of a large share of the miscellaneous exhibits by stating that they offer a like similitude. As at every recurring fair there is some one prominent contribution of especial interest, so there is to this one, in the shape of

THE POTTERY DISPLAY.

Visitors who are familiar with the exquisite ware of France and England will see, doubtless, little to admire in the two neatly arranged exhibits of the Union Porcelain Works of Brooklyn and of a New York manufacturer; but on the other hand, those who have watched the progress of the pottery industry in this country will see, in the ambitious attempts at majolica ornaments, Parian statues, and like objects hitherto only imported into the United States from Europe, an advance both rapid and full of promise for the future. We have before us a French journal in which one of the French artisans, who had been sent to this country to examine the Centennial Exposition and who has returned, warns his trade publicly that the competition of the United States in the manufacture of fine pottery is greatly to be feared. Probably the best we can do in fine porcelain is that shown at the American Institute Fair. The taste displayed in ornamenting is sometimes questionable; but the work is there, and there is plenty of artistic ability in the country to supply the needs when once its attention is directed to the subject. In the Brooklyn factory's display, quite a handsome vase is exhibited, commemorative of the Centennial year. Scenes from the national history are executed in bas relief in panels around the base; on the sides are medallions of distinguished men, and the handles are bisons' heads. The painting is appropriate and tasteful, and as a piece of pottery it is of excellent fineness. There is also in the same exhibit a commemorative cup, showing some fine modeling work which is worth examination.

THE MACHINERY DEPARTMENT

is now a chaos, but we are promised a host of new things. The driving engines are three in number; an 80 horse power Wheelock, a Brown engine of similar size, both models of admirable workmanship and finish, and a Hampson & Whitehill 40 horse power machine. There is the inevitable and omnipresent Baxter engine in its various sizes, possessed of a new interest through being attended by a lady engineer. A new yacht engine, said to be of 5 horse power, built by Harsen, of Greenpoint, is a neat, compact, and very small machine, which seems excellently suited for small boats. The cylinder is vertical and inverted, and there is a new and simple reversing gear, which consists of a rod moved to and fro in an inclined slot in an eccentric, thus changing the latter to one side or the other, and so, through the eccentric rod, controlling the motion. The device, which might be termed a single link, works excellently. Celluloid emery wheels, composed of a mixture of celluloid and emery, are exhibited at work. They seem to have the advantages of not glazing, they run with little noise and few sparks, can be used with water, and the wheel at the Fair has cut a clean square-edged notch in an old file, a good piece of test work.

Of course the band and jig saws are out in full force, and the popularity of the Chinese puzzles and toy frames and furniture which they manufacture shows no sign of waning. We notice a new tool interesting to woodworkers, called a friction feed cut-off saw. The friction feed is obtained by passing a strap, which connects the treadle and the vibrating saw carriage, over a friction pulley which is always revolving when the saw is in motion. By pressing lightly on the treadle, the band is tightened over the pulley, and the latter thus pulls the saw forward to its work. There is also a new gage and measuring attachment, placed transversely across the front of the table, consisting of a perforated plate and sliding stops thereon, which last is connected with a pin and knob by a rod. In using, the pin is placed in the hole on the plate corresponding to the length to be cut, and the stop is thus moved to the exact distance from the saw indicated in inches by the scale. This is done very quickly and so saves time. A new gear wheel is exhibited in model (why, we fail to perceive, as opportunities might easily have been afforded for showing full sized wheels at work), made after a new process, the V-shaped teeth being forged or pressed by the action of a die revolving in contact with the heated blank wheel, which likewise rotates. Advantages claimed are absence of flaws, accuracy, strength, no back lash or lost motion, etc. Veneered pulleys are novelties, and seem to be a cheap and fair substitute for ordinary wooden pulleys. The peripheries are made of three layers or veneers of ash. The pulleys run true and easily. They are not visible in actual use, and hence no further opinion is possible. Exhibitors fail to consult their best interests when they show devices idle, which can easily be displayed in operation. This is becoming a too common error at the American Institute Fairs. The mechanical public, the interest of which it is hoped to enlist, is not at all inclined, under such circumstances, to accept assertions of advantages on faith.

Handasyde's Composition for Boilers.

Messrs. C. H. Handasyde & Co., Dunleith, Scotland, have recently established an agency at 24 Broadway, in this city (see advertisement on another page), for the introduction of their anti-incrustation composition for stationary boilers and locomotives in this country. The composition has been tested on the railroads and in collieries and ironworks to a

great extent in England and Scotland; and we have before us a long list of the names of the most extensive manufacturers abroad who are using the article at the present time. Mr. G. C. Campbell, the agent in this country, has instructions from the manufacturers to make no charge to users of the composition unless it accomplishes all that is claimed for it; and they modestly state in their circular that they "refrain from claiming for their composition any advantage over others of a similar nature, but ask for a fair and unprejudiced trial, so that its real worth may be ascertained."

The Patent Business of Great Britain.

In the year 1875, the applications for patents made in Great Britain and Ireland numbered 4,561, being 69 more than in 1874. The increase is less by 129 than that of the previous year, and this diminished rate of growth is fairly attributable to the depression of trade.

The British patent statistics enable us to form an idea of the proportions of inventions in that country that have any substantial value. For instance, in the year 1875, 1,173 patents were not carried further than the six months provisional protection, which is the preliminary period for which patent is granted; and as a rule, only 28 per cent of British patents survive their third year, and 10 per cent their seventh. Small as this business appears in our eyes, the considerable fees exacted from patentees realize altogether a very large income, the year 1875 yielding a revenue of over \$550,000 in gold after all expenses were paid. This sum is about the average amount; and since the office was remodeled in 1852, over \$6,150,000 has been paid into the public exchequer. The claims of Science are now being urged upon the Government; and it is to be hoped that, in consideration of the large revenue yielded by the patent office, the proposed Science Museum may be established. A site on the Thames embankment has already been suggested for the purpose, and a plan for the institution is published in the Patent Office Report for 1875, recently issued.

DECISIONS OF THE COURTS.

United States Circuit Court--Northern District of Ohio.

HARVESTER PATENT.—HENRY F. MANN vs. EDWIN BAYLISS. (In Chancery. — Before Emmons, C. J. — April Term, 1876.)

EMMONS, J.:—In this cause complainant's bill recites that he is owner of letters patent of the United States, dated February 28, 1871, being a reissue and extension of letters patent No. 15,044, dated June 3, 1856, said reissued letters patent being numbered 4,281, for an improvement in harvesters, complainant having been one of the original patentees, and having acquired the interest of his co-patentee, Jacob J. Mann, by an assignment from said Jacob's administrator. The improvement consists, in brief terms, in having an elevated side delivery of the cut grain in the straw, by means of an endless apron, whereby the grain is discharged into a stationary receiver, of concave form, from whence by means of a revolving rake, the teeth of which describe a circle nearly coincident with the circle of which the concave receiver forms a segment, the grain is gathered into gavels of suitable size for binding into sheaves or bundles. The bill prays answer, account of profits and damages, and injunction in the usual form.

The answer denies originality and novelty of the invention, as also infringement, in that whereas by complainant's device the grain is discharged into a receiver which is "concave" in form, the machines constructed by defendant discharge their grain into a receiver which is "flat and horizontal" from which it is taken by the binder without the use of the revolving rake. On the hearing the question turned mainly upon the 4th claim of complainant's patent, which is in these words: "4. The stationary concave receiver I, having a continuous surface, arranged as described at the side of a harvesting machine, having an elevated side delivery so as to receive the cut grain from the elevating and delivery apparatus, and collect the same into gavels preparatory to their being discharged from the machine." Held, that the device employed by the defendant is essentially different in form from that employed by complainant, as described in said 4th claim, and does not constitute an infringement as charged in the bill. Complainant's bill dismissed with costs. Notice of appeal to the Supreme Court.

The opinion of the court in this case was delivered orally, and was not reduced to writing, and this report is made by the clerk. (Geo. H. Christy and Wm. Bakewell, for complainant. S. A. Goodwin, for defendant.)

DECISIONS OF THE COMMISSIONER OF PATENTS.

IMPROVEMENT IN SHUTTER HINGES.—HARVEY LULL.—EXTENSION. (In the matter of the application of Harvey Lull, for the extension of letters patent of January 2, 1854, No. 10,477.—Decided July 27, 1876.)

DOOLITTLE, Acting Commissioner:—This application for the extension of the above named patent was made under the authority of the Act of Congress, approved April 29, 1876. It was once extended for seven years, from the 31 day of January, 1868, which term expired the 2d day of January, 1875.

From the Congressional Record, in which the proceedings relating to the act above cited were printed, it is shown that this case was very fully discussed in both Houses of Congress. No opposition was made there, or has been made before this Office, since these proceedings commenced. Over sixty prominent manufacturers in various large cities signed the petition that applicant made to Congress. The invention consists in the construction of a shutter hinge with projections and bevels, so that it may lock itself automatically when opened. The Examiner imports the invention to be novel at the time of the grant of the original patent, and proof shows that no self-locking hinge made at an earlier date has been introduced into the market to any considerable extent. Nor does it appear that any similar invention patented since that time has superseded it. The proof also shows that the invention is valuable and important to the public to the extent of many hundreds of thousands of dollars, that less than \$10,000 profit has been realized by the inventor from the sales of the article, and that nearly all of that has been consumed in litigation.

The Examiner reports, and the proof substantiates his statement, that these hinges have been sold in quantities sufficient to fit 2,160,000 windows; and it is estimated that the public has been saved in breakage, wear and tear, and extra fastening, to the amount of \$540,000. The inventor is now very old and poverty-stricken, with a wife and several children depending upon him for support. It is also shown by numerous affidavits and other evidence that the effect of the proposed extension upon the public interest will be good, inasmuch as it will prevent the manufacture of cheap, lightly constructed wares, and will continue the manufacture of a valuable hinge in the hands of those who will construct it in proper shape and of durable material. The applicant has fully complied with all the requirements of the law and Office practice entitling him to the extension of his patent. Very rarely has a more meritorious case been presented, and it is without hesitation that the extension applied for is granted.

Recent American and Foreign Patents.

NEW MECHANICAL AND ENGINEERING INVENTIONS.

IMPROVED CHIMNEY FLUE CLEANER.

James Grimes, Portsmouth, Ohio.—This invention consists of spring acted wing sections of the cleaner brushes, which are locked to the stem until the same is carried up in the chimney by means of jointed links. The wings are released by a cord running down along the stem.

IMPROVED WATER ELEVATOR AND PURIFIER.

Conrad Hartzell, St. Joseph, Mo.—This invention causes a current wheel located on a float to operate a pump, which draws its water through a submerged tube, at the bottom of which is a filter. The object is to afford a constant supply of pure water.

IMPROVED BALANCED THROTTLE VALVE.

Hubbard Hendrickson, Red Bank, N. J.—In opening the valve, the movement of a stem first moves small additional valves, which are easily moved and admit the steam. The latter passes to the other side of the main valve and equalizes the pressure so that it can be moved freely.