# THE INDUSTRIES AND RESOURCES OF JAPAN.

by Japan at the Centennial, which, for completeness, even to the smallest minutiæ capable of affording useful information relative to the industries and resources of the country, certainly transcends the exhibit of any other nation. This, perhaps, is due to the fact of Japan having entered mines is either effected by torches of dried bamboo or oak into the spirit of the enterprise with a heartiness, born of a wood, which latter is beaten until it becomes soft enough to natural pride in her rapid progress, and in no small mea- burn easily; or by iron lamps in the shape of saucers with sure owing to the knowledge that, in that progress, the a double suspension. Sometimes the lamps consist merely people of the United States have been most nearly con- of a kind of murex shell containing vegetable or fish oil. cerned. Prior to the Vienna Exposition of 1873, the Japan- The wick is made of the pitch of soft rush (juncus effusus), ese had never participated in any World's Fairs, and even which is also used for wax candles and ordinary lamps. at the Austrian show the contributions were mainly pur-1. The annual production of the mines of Japan, in gold, silchased and forwarded by the Japanese government, private ver, copper, iron, lead, tin, coal, and coal oil, was valued in individuals neither appreciating the advantages of the display nor being willing to send their goods over so long a journey. For the Centennial, however, a different feeling has been manifested. As early as the summer of 1874, it was definitely decided that Japan should participate, and at once the most thorough measures were set on foot for securing the superb collection now here. Provincial authorities gether with the custom of leaving the mine to be worked were instructed to do their utmost to induce the leading entirely by contracting miners, without any system and manufacturers to prepare exhibits and to assist them with under no control, has not only the effect of causing a great money and advice Those who had acquired experience at part of the vein to be left untouched, but also in many Vienna were called upon to give the benefit of it to their countrymen. The government set an example by spending \$30,000 for its official collection, and appropriating a further sum of \$70,000 in making advances to various manufacturers so as to assist them in the production of such pieces of workmanship as would do credit to Japanese art and industry. In addition to this, the sum of \$300,000 was set aside for general expenses, including the cost of transport and freight; and lastly, the government charged itself with the traveling expenses of all such exhibitors as might wish to accompany their goods to Philadelphia. Certainly no government has ever manilested greater liberality to ward its people in any similar enterprise; nor can such munificence be regarded otherwise than in the light of the highest of compliments to the people of the United States and their Exposition.

A general description of the exhibit of Japan has already appeared in these columns. Lately, however, the Japanese Commission has issued a work, modestly termed an official catalogue, but which is really very much more, since, out of a hundred and thirty pages, thirty only are given to the list of articles, and the remainder are devoted to a series of excellently written descriptions of the principal resources and industries of the country. With this volume the visitor can study the entire exhibit intelligently, for he has before him the details of the manner of production of all curious and elegant articles displayed. We shall make copious extracts from the pages of this work, beginning with the subject of

# MINING AND METALLURGY.

Very little is known about the origin of mining in Japan. It is, however, a fact that several mines were being worked during the latter part of the eighth century (Japanese period Dia-Do); and the large number of old abandoned adits, which are to be found in the metaliferous districts, leave no doubt as to the fact that mining was in a flourishing condition centuries ago.

The system of working mines has changed but little since olden times, and consists simply in driving one or several adits from places where a vein or seam appears on the slope or top of hill; the vein is followed as far as possible. and, when necessary, lower adits are driven, until in the end it is found impossible any longer to overpower the water with the very imperfect machinery used for pumping and draining. Many mines have had to be abandoned after a longer or shorter period of prosperity, solely on this account. In certain instances great efforts have been made to avoid this misfortune, and adits have been driven for the purpose of draining off the water. Thus in the lead mines of Hosokura, in the province of Rikusen, a draining adit may be seen of 8,370 feet in length; nevertheless the mine has been almost entirely abandoned, and the actual working places are at present far below the level of the water adit in question. In the mines of Udoge, where the rock is very soft, a water adit 13 feet high and 10 feet wide was commenced a few years ago. Ever since the earliest times yield of the Karatsu district may be estimated at 80 to 90 the timbering of the adits has been known and effected with | tuns daily, which is sold at neighboring ports at \$4 to \$5 all the necessary skill; and as the wood is both abundant per tun.

and cheap in most places, it has not been spared. The dimensions of the adits vary greatly; in some mines they are about eight miles west of Nagasaki, has been commenced on so narrow that it is almost impossible for a full-grown per- the modern system, with improved machinery. This mine, son to pass through, and consequently children have to ef-1 actually the property of a Japanese company, is now very fect the transport of the mineral. The latter is usually packed prosperous, and produced 78,000 tuns in 1874. In the island in strong sacks, made of matting, which are fastened to the child's back by means of a rope. In many places the passage becomes so low that the child has to crawl along on all fours, dragging the sack of mineral behind him. The ladders, used for getting from one adit to another on a different level, are simply trunks of trees with steps cut into them. 'The means employed by the miner for attacking the rock consists merely in the use of hand tools, namely, the pick, the gad, the hammer and chisel. Gunpowder has only been brought into use for blasting purposes in latter years, and its introduction is chiefly due to foreigners. The apparatus used for removing the water is composed only of small wooden hand pumps, buckets and occasionally of a kind of water wheel with scooping paddles, and moved by treading; the water pipes are either made of bam- i for refining the crude oil. Although the presence of the oil boo or wood. As regards the ventilation of the mines, it is has been known for a long time, the people of the country often realized with more or less of perfection, by connect- only began to use it forty-six years ago. Since then, no less ing two adits of different levels, and in some cases by run- than 508 wells have been sunk.

ning an air channel, made of wooden planks, throughout We have already alluded to the magnificent display made the whole length of the adit, so as to allow the air to circulate through the adits and this channel. In the lowest adits, however, the absence of sufficient ventilation has in many cases caused them to be abandoned or else to be worked on a very small scale only. The lighting in the

1875 at \$3,687,275.

Of late years the government has made great efforts to improve the condition of mining and metallurgy, the principal shortcomings of which are: 1. The insufficiency of machinery for pumping out the water. 2. The imperfect system of attacking the rock with only hand tools, which, tocases the future of the mine has been endangered by the total absence of any well combined plan. 3. The imperfection, and consequently the expensiveness, of the processes employed for dressing, preparing, and smelting the ores. Some mines, however, such as the Takashima coal mines, near Nagasaki, are now being worked according to the modern system and are provided with the necessary steam pow

The working of several other mines is being improved in the same manner, and the new works are already in course of erection at the silver and copper mines at Ikuno, Sado, and Ugo. The government mining department has also commenced the construction of several high furnaces for the smelting of iron ores.

It will be observed that an excellent field is here open for improved mining inventions of all kinds.

# MINERALS, ORES, ETC.

The veins of gold and silver ores in Japan are generally composed of quartz, native silver, silver ore (argentite and antimonial silver), containing more or less gold and iron and

The most important and almost the only iron ore worked till now is the magnetite, found either in the shape of solid course to the whetstone. Garnets are used for grinding and masses or in that of sand. In general the magnetic ores contain from 62 to 65 per cent of metal. The magnetic sand and the solid ore are the only materials used for smelting iron; however, iron glance and brown hematite, with 56 to 60 per cent of iron ore, are also found in Japan.

Copper ore is found in many places, and may be considered as a rich ore, since it contains on an average from 10 to 15 per cent of metal. It is composed mostly of copper pyrites, together with more or less iron pyrites, and is found the northern part of the island of Nippon, but ores are also found in more southern provinces, as for instance in Bichiu. Sometimes the ores are much richer than has been stated, and contain 25 to 35 per cent, even up to 55 per cent of copper.

'The lead ores which are found in Japan are mostly galen as, with 40 to 80 per cent of metal, and sometimes a small quantity of silver. Tin ore is found in Satsuma, Suwo, and Bingo.

In later years, attention has been drawn to other minerals, such as gray antimony and bioxide of manganese; but they are, as yet, without great importance. A cobaltiferous mineral, which is found in the shape of small pebble conglomerates in the bed of certain rivulets, has been known for many years. After the raw material has undergone a certain process of powdering, washing, and calcining, it is used for blue porcelain paintings.

### COAL, ASPHALT, PETROLEUM,

'The most important coal fields are those in the northwest of the Island of Kiushiu, in the district of Karatsu; and also in the Island of Takashima, near Nagasaki. The total

The working of the rich seams in theisland of Taskashima, of Amakusa, on the west side of Kiushiu, a sort of coal is found, which is very much like anthracite.

# BUILDING MATERIALS.

Although building stones are by no means scarce, yet they have been seldom used for houses, but mostly for foundations, temple stairs, gateways, sea walls, and battlements, which latter are sometimes of enormous extent: as for instance in Tokio and Osaka, where some granite stones of 30 feet in length by 18 feet can be seen. The battlements and walls are generally made of well dressed blocks of irregular shape, built up without the use of mortar. The chief materials used for these different purposes are granite, trachyte, and trachytetuff.

All kinds of colored mixtures of sand, clay, and lime, and mineral colors, are prepared for plastering the inner walls of the houses, and a very fine black stucco is used for the exterior of the fireproof warehouses. In order to give the plaster more solidity and coherence, paper fibers (prepared by boiling old paper) and the gluish decoction of a fucus, called fu, are mingled with the powder.

# CLAY, KAOL'N, SILEX, ETC.

Minerals used for pottery of all kinds, such as clay, kaolin, silex, etc., are very abundant in Japan, and are spread over all the country. In the small town of Arita, province of Hizen, the head center of the porcelain manufacture in Japan, within a very limited circuit, not half a a mile in diameter, there are found, imbedded in the rock at different places, all the materials necessary for the biscuit, for the coating of the ware before glazing, for the glaze, for the craquelé, etc., the best being of such good quality that, after being powdered and decanted, it is used without any further mixture for the finest ware, the so-called egg shell porcelain. In the central part of Nippon, where granite is the principal constituent of the mountains, in the province of Owari, Yamashiro, and the island of Awajishima, opposite Hiogo, beds of petuntse, very much like the Bohemian material, are to be found. When used for porcelain, this material is mixed with silicious felspathic minerals from other places. A thorough mineralogical and chemical examination of these minerals has not yet been made, but would, no doubt, prove to be of great interest. Graphite has been discovered in Satsuma and Rikuzen; certain very pure samples have been found fit for such purposes as the manufacture of pencils; but in this case it would have to be washed and ground with an addition of clay. Whetstones, grindstones of all qualities, are very abundant, and copper pyrites, occasionally mingled with blende and galena. are in the hands of every artisan, who, on account of the softness of his cutting tools, is frequently obliged to have repolishing hard materials.

# Navel Items.

The naval appropriation bill, which became a law on July 1, reduced the rank and file of the United States navy to 7,. 500 men. To conform to this reduction, all enlistments and re-enlistments have been stopped; and since the beginning of the month more than 1,000 men have been discharged.

In consequence of the smallness of the appropriations, orchiefly in clay slate. The principal mines are situated in ders were issued by the Department, on July 11, to suspend all work for the government which was in progress, under contract, at the various private machine shops in the Eastern and Middle States.

#### NAVAL ENGINEER CORPS GAZETTE,

July 11, Past Assistant Engineer George P. Hunt and Assistant Engineer A. B. Willits, were ordered to the monitor Wyandotte. In addition to their duties on board that vessel, they will have charge of the machinery of the other monitors at Norfolk, Va.

Passed Assistant Engineer I. R. McNary and Assistant Engineer A. F. Dixon were, on the same day, ordered to the monitor Ajax, at Port Royal, S. C. They are to have charge also of the machinery of the other monitors at that station.

The tractive force of horses is as follows: Rate in miles per hour:  $2 \quad 3 \quad 3\frac{1}{2} \quad 4 \quad 4\frac{1}{2} \quad 5$ . Tractive force in lbs.: 166 125 104 83 62 41.

# DECISIONS OF THE COURTS.

United States Circuit Court-Western District of Pennsylvania.

SHOUP et al. 28. HENRICI AND LENZ .- PATENT OIL WELL TUBING.

[In equity, No. 15.-May term, 1872.] In a proceeding for infringement of a pump patiented and designed for use in oil wells, the defendants proved the existence of a pump used in a salt water well, consisting of the identical combinations elabated by complain-ants, and the results produced by the latter pump were the same: Heid, that

As the industry of the country is being developed by the introduction of new methods and machinery, so will the demand for mineral combustibles increase, and mining will be effected on a much more extensive scale.

Petroleum is found in the districts to the northwest of Tokio, as, for instance, in Yechigo, Shinano, Ugo, etc. In the first of these provinces oil was discovered 300 years ago; and it has always be counted among the seven wonders of Yechigo that a natural combustible gas issuing from the ground in certain places, and could be brought through bamboo pipes into the interior of the houses and used for illuminating purposes, as it is now used for heating the small stills

Ib Oil wells, the detendments proved the canonications calibated by complainment, and the results produced by the latter pump were the same: Held, that although subsequently the whole combination in the latter promp was not used, it was not such an abandoned experiment as would allow the combination in the latter promp was not used, it was not such an abandoned experiment as would allow the combination in the latter promp was not used, it was not such an abandoned experiment as would allow the combination in the latter promp was not used, it was not such an abandoned experiment as would allow the combination in a device used for analogous purposes, and in which no change of mechanism was needed, and the operation of such device was successful, it was: Held, that the patent upon which the suit was brought could not be sustained, although the use of the device ould take it up and appropriate it exclusively. McKENNAN C. J.: The complainant's patent is for a combination of a pump tube, an outer or larger tube or casing, and a seed bac outside of the latter. It is designed for used in oli wells, which are usually of great depth and small caliber, and its object and operation are to allow the escape of gas from the bottom of the well through the space between the pump. The defendants admit that they have used the combination described in the platter, and its'tfy such use upon the ground that the patentee was not the first and ork and live of or of the ground. The such all usify such use upon the ground that the safe was not the maximum admits obtain allow they have used the to combination described in the attract, and justify such use upon the ground that the platentee was not the more than the safet by others before the date of the safet the safet that this defense has been maintained; but I do not propose the safet that this defense has been maintained; but I do not propose the case of the safet that the safet that the safet case of the safet that the safet that the safet the safet the safet the safet that the s

It was known to and used by others before the date of his alleged inven-tion. Iam satisfied that this defense has been maintained; but I do not propose to state at length the reasons upon which this conclusion is founded, or to advert in detail to all or any of the proofs in the cause which have in duced it. It will suffice to refer to one instance of its public and notorious use before the date of the alleged invention of it by the patentee. This occurred at what is called the Donelly well, and years before the patentee over con-ceived the idea of his invention. It was a well of small callber, and sunk to a considerable depide to obtain salt water. The devices used in it for that approve consisted of an outer tube or casing, with a seed has outide of it and not to the well, and a pump tube inside of the casing, with aspace between them. A large volume of gas was colved in the tube, with out passing through the pump valves. It is hardly disputable that these de-vices and die patentee's invention were substantially identical in their con-struction sind arrangement. and that they operated alike in furnishing a vent for the gas.

But in the Donelly well the double casing was found so to contract its cal-iber as to greatly diminish the supply of sait water, and for that reason it was abandoned after a brief period of use, and the single tubing was re-stored. It is therefore claimed to have been an unsuccessful and abandoned

was abandoned after a brief period of use, and the single tubing was re-stored. It is therefore claimed to have been an unsuccessful and abandoned experiment. It was said before that the combination in both cases consisted of the same elements, and that they were arranged and operated in substantially the same way. But was the purpose for which the patentee's invention is in-tended to be used effectuated by the devices employed in the Donelly well? There is no doubt about this. The useful result contemplated by the inven-tion in question is the avoidance of the effect of the gas upon the pump valves by supplying an avenue of excave for it between the pump tube and the casing. The Donelly devices furnish the s me means for the escape of the gas and the relief of the pump valves, and they were used sufficiently to illustrate and test their complete efficiency in that direction. What more was required to demonstrate the completeness of the device as a means of accomplishing the result contemplated by the patcnee? No change in mechanism was needed, and it was successful in operation. This is all that is required to take it out of the category of abandoned experiments. Is use might be altogether discontinued; but this would only leave it open to the public to use ft. Certainly no subsequent inventor could take it up and anpropriate it exclusive; What was said by the Chief Justice in Galor #8. Wilder, 10How., 477, is dentify the no this point. We do not understand the circuit court to have said that the omission of Connor to try the value of his safe by proper tests would derive to fits priority, nor his omission to bring it into public use. He might have omit-fed both, and also abandoned its use and been ignorant of its value; yet, if it was the s me as Fitzgerald's, the latter would not, upon such ground, be entitled to a patent, provided Conner's safe and its mode of construction were still in the memory of Conner before they were caselled by Fitzger-ald's patent. The bill must be dismissed with costs.

Becent American and Loreign Latents.

# NEW MECHANICAL AND ENGINEERING INVENTIONS.

IMPROVED COMBINED TIME AND COMBINATION LOCK. Franklin McDuffee, Rochester, N. H.-By the chronometer lock now in general use, no entrance can be made to the safe except at certain hours, however imperative the necessity, as, for instance, an approaching fire. This objection is completely obviated, as, by this invention, the proper persons arriving can open the lock at any time without waiting for the action of the clockwork to release the bolt. The objects of the invention arc secured by the following method: The tumblers, all on the same spindle and operated by one dial, are so arranged that they can be locked on two separate combinations set by two individuals, each person being ignorant of the combinations, except his own. For instance, suppose the president and cashier of a bank are the persons intrusted with these combinations, the cashier can set his own part of the lock without the presence of the president, and he can always unlock the lock at such hours as the clockwork permits, and at no other, and can do so without the presence of the president. He cannot be compelled to open the safe, as he cannot open it alone until the proper hour arrives, yet after that hour he can open without help. This may be done for years without calling on the president. But should the clockwork stop at any time, or should it become necessary to enter the safe at any unseasonable hour, the cashier has only to summon the president, who, using his combination in conjunction with that of the cashier, can open the lock. Neither can open at such time alone.

# IMPROVED ROTARY PUMP.

Robert Burns Reynolds, Stockport, N. Y.-This consists of two rotary pistons on parallel axes, both turning in the same direction so that they have a wiping action on each other instead of the rolling development of one on the other, as has always been the case in pumps of this character.

# IMPROVED RAKE TOOTH LATHE.

Sylvester Bisbee, Sumner, Me.-Sliding on the main frame, in guides, is a reciprocating carriage. Mounted on one end of the carriage is a long cylinder, at the other end a short cylinder, each of which contains eight grooves. These cylinder receive, in addition to the reciprocating motion, a rotary turn of one eighth of a revolution, so as to present the empty grooves to the feeding devices, and those containing the rods and blanks to the devices for forming the teeth in proper order, said feeding and forming de-vices consisting, essentially, of a feed plate, setting knife, cutter head, set-back, saw, ejector, projection, and feed hook, together with the devices for turning the tenon.

#### IMPROVED SCALE BEAM,

Hiram L. Grisell. Pennville. Ind.-This is a contrivance of tables with the beams and weight of a scale, for the computation of the values of fractional quantities. Example: If fifteen cents' worth of an article worth twenty cents a pound is required, the weight is moved along the beam until it arrives at fifteen on the line marked twenty at the end, when it will show twelve ounces as the required quantity.

# IMPROVED PORTABLE RAILROAD TRACK.

Manuel De M. C. Y Martinez, Havana, Cuba.-This is an arrange ment of railway track in short sections, that can be easily handled to put down and take up. The parts are adapted to be laid on the natural surface of the ground, and to be kept in position with but little labor and expense

#### IMPROVED RAILWAY CAR TRUCK.

Georg O. Eaton. Warren, Me.-Cars frequently require to be used upon and run from a narrow to a broad gage track, and vice versa. To enable this to be done, it has been heretofore requisite for railway companies to construct and keep on hand, at the junction of the different lines, two sets of trucks, one adapted for a narrow gage, and the other for a broad gage, so that, when a car was required to be changed from one track to the other, it was jacked up, the trucks removed, and others substituted. The expense and loss of time incident to this method constitute serious objections to it, and to obviate them is chiefly the purpose of this invention. To this end, it consists, broadly stated, in making the wheels of the truck adjustable laterally or towards and from each other. The truck is therefore an improvement in that class in

#### IMPROVED LIFTING MACHINE

August Ficht, Bellasylva, Pa.—This consists of a lifting  $bar_{\phi}$  toothed on opposite sides, between guide ribs, for keeping it in gear with a couple of toothed wheels on a pair of shafts mounted on the top of a frame. Said shafts have cranks or levers to work them, and ratchet whcels provided with pawls to retain the weight at any hight. The invention also consists of the supporting frame for the rollers, for working the lifting bar, contrived in two readily detachable parts, to facilitate the application of the machine to a stump or other object to be lifted.

# IMPROVED DEVICE FOR DECOMPOSING WATER FOR FUEL.

Milton W. Hazelton, Chicago, Ill.-This consists of a tight pan under the fire grate, into which an air pipe from a fan blower and a water pipe enter below holes of conical form for driving water spraythrough the holes into the fire above. The inventor supposes that, by the heat of the fire, the steam will be desiccated, and that the hydrogen can be burned as fuel. The invention may prove useful for increasing the draft of furne

# IMPROVED DEVICE FOR CLOSING GATES.

John D. Reed, Greencastle, Ind.-This consists simply of a horizontal shaft, journaled to the gate post and rotated by a descending weight attached by a cord to a drum on the shaft. On one end of the latter is bevel gearing communicating with the gate, which is thus shut when the weight descends.

# IMPROVED SPEED REGULATOR.

Nathaniel U. Metz, Norritonville, Pa.-This consists of a disk on the driving shaft to be regulated, carrying a pair of centrifugal weights, which are thrown out against the flange of a stationary disk. The friction of the latter is made to move out bake shoe with great force against the flange, to arrest the motion of the shaft in case the belt runs off, or the engine or other power runs too fast.

#### IMPROVED PAPER-CUTTING MACHINE.

John P. Dunwald, New York city.-This consists mainly of a combination of the swinging and balanced cutting knife with the clamping mechanism of an adjustable cutting gage and of a slid-ing feed or set gage of special construction. The set gage may be detached entirely, as well as the side guide piece, when the same is not required, or when the paper is to be cut at different angles.

# IMPROVED EXCAVATOR.

John P. Bonnell, Elizabeth, N. J.-This is a machine which is movable on wheels along the ground, and contains an endless chain of buckets, which dig the earth and carry it up to a laterally working endless discharger. The buckets are fed up to the work power which moves the machine along the ground. The ssential part consists of a machine arranged on feeding or propelling wheels as a fulcrum, with a contrivance for elevating and lowering the buckets in advance of the fulcrum to gage the machine for grading ascending and descending inclines, also for running it into and out of the ground in using it for ditching pur-The buckets are extended outward, at cach side, beyond the ends of the drum, over which the said chains work to cut their way in advance of the carrying wheels sufficiently wider than the latter and their housings to enable the apparatus to run freely.

### IMPROVED PROPELLER WHEEL,

William S. Wootton, Scottsburg, Va.-This wheel is designed more particularly for the shallow rivers of the West, and is intended to operate either as a paddle wheel, or by grappling the bottom of the river, being provided with flukes for this latter purpose, which catch in the river bed and urge the boat along. It is automatically adjustable to the irregularities of the river bed; and instead of having a central axis, is provided with internally projecting teeth upon its periphery, which engage with and receive motion from one of the pinions of two supporting shafts, of which shafts, the one that transmits the power is stationary, and the other is movable to regulate the elevation of the wheel when employed as a paddle wheel.

# IMPROVED MACHINE FOR MAKING BARRELS.

SamuelP. Hodgen and John W. Yelton, Neosho, Mo.-This consists of a circular vertically adjusting follower, arranged over a platform, on which the lower head of the barrel is placed to nail staves on. The follower is hooped with a band of iron for clinching the nails driven against it, and is employed as a gage, around which to set the staves, and for clinching the nails used in nailing on the hoops. The follower also has abox securely attached in its centers, so that the rod or shaft will pass through it without binding, and at the same time hold said follower perfectly true as it is raised or lowered.

# IMPROVED PACKING FOR BALANCED PISTON VALVES. David Dale, Millerstown, Pa.-This is a contrivance of radial plugs in the pistons, on which steam is caused to act to push out the packing ring, one of the said plugs acting by a wedge between the ends of the ring to expand it, and another, or more if desired, acting by a stiff spring, which bears at its ends on the packing ring

# IMPROVED FEED WATER HEATER AND FILTER.

and distributes the pressure upon two points.

Georg F. Jasper, Freeburg, Ill.—Thepurpose of this invention is to still further improve and simplify the feed water heater and filter for which letters patent were granted to the same inventor heretofore. under date of December 1, 1874, and June 8, 1875; and the invention consists in the arrangement of a double water box in the heating tank, in connection with the filtering receptacle below. The exhaust steam is allowed to act at the bottom and top sides, while acting only on the bottom of the upper box, so as to impart a higher temperature to the water in the lower box than in the upper.

### IMPROVED RAILROAD GATE. Harmon Graybill, Cassville, Wis.-This is an improved railroad,

COMPOSITION OR CEMENT FOR PRESERVING FRUIT, ETC.

Charles A. Dards, New York city.-This is a composition employed for the purpose of sealing a soft wrapping paper that has been rendered airtight by a mixture of oil and alum around the fruit, vegetable, or other perishable article. The articles are then packed into boxes, filled with sawdust, and kept in a fresh state for any length of time. The composition consists of starch, a suitable fat, salt, carbonate of ammonia, a suitable vermifuge, alum, citric acid, and water.

# IMPROVED MECHANICAL LEDGER.

Otto Sallbach, Pittsburgh, Pa., assignor to himself and Charles Ruhe, of same place.—This invention consists of a series of revolving strips, with numerals indicating dollars and cents, which strips are moved by an adjustable friction roller and shaft, the whole being enclosed in suitable manner. The amount is kept for each customer by entering his name to a certainnumber on an inside slate, and setting the printed strips to the exact number of dollars and cents by setting, first, a friction wheel to move the lower strip, and then to the upper. The amount due will then be visible through the corner glass plate and indicate to the customer the state of his account, his number and date of last purchase only being placed on the outside. When the account strips have been adjusted, the friction wheel is released from contact with the strips, so that no accidental changing of the same is possible.

# IMPROVED BAG HOLDER

Lealand H. Bristol, Lawrenceville, N.Y.-This invention consists in combining a sliding spout with a bench strap and screw, and also with a wedge-shaped rest, the latter serving to graduate the bag from the spout down to the bench.

# IMPROVED BOOT LACE FASTENER.

James McDonald, Campbelltown, Province of New Brunswick, Canada, and F. A. McDonald, Durham, Province of Nova Scotia, Canada.-This invention relates to the ready, secure, and convenient fastening of lace boot strings by means of two plates, one being on each side, and the string being passed through as well as between the plates, before being clamped, so that escape is almost impossible.

# IMPROVED WIRE FENCE BARB TOOL.

Homer W. Prindle, Fort Dodge, Iowa.-This is a tool for forming barbs on fence wires, having its lower end bent over to one side to form a hook, and having a slot or notch formed in its edge, close to its lower end, to adapt it for use.

#### IMPROVED FOUNTAIN PEN.

Robert Douglass, Buctouche, Canada.-This invention consists of a spoon-shaped termination of the back portion of the fountain holder, in the cavity of which is the opening for the issue of the ink, and over which the pen is attached, so as to receive the ink at suitable distance above the point. There is a cock in the ink passage from the bottom of the fountain to this issue, to regulate and shut off the flow of ink at will, and at the top of the fountain is a vent to admit air, for allowing the ink to flow out properly.

#### IMPROVED HORSESHOE.

Charles D. Rattray and Alexander Robertson, New York city.-This is an improved ice shoe attachment for horses, which may be eadily and firmly applied over the common shoe and to the hoof, so as to be used whenever required, and taken off without difficulty. It consists of an ice shoe with sharp calks that is fitted over the common shoe, and attached to the hoof and shoe by curved outer pieces passing through the attachment, and by interior binding pieces and screw nuts screwed on the inner threaded ends of the curved binding pieces.

#### IMPROVED RUBBER BOOT.

James A. Bates. South Abingdon, Mass.-This invention consists of a rubber boot provided with a leather counter, applied over the lining of the same.

IMPROVED METHOD OF LABELING MINERAL SPECIMENS. Charles W. Cannon, Helena, Montana Ter.-Plaster of Paris is mixed with water to the consistence of thick cream, and applied to the specimens in sufficient quantity to form a space large enough to receive the desired inscription. The specimens are then jarred to cause the coment to set with a smooth surface. After the cement has set and become sufficiently dry, a small pointed brush is used for putting on the inscription with India ink.

### \*\*\* NEW WOODWORKING AND HOUSE AND CARRIAGE BUILDING INVENTIONS.

# IMPROVED STATION INDICATOR.

Charles M. Sexton, Aurora, Ill., assignor to himself and Orlando O. Wormwood, of same place.-This consists of a polygonai roller, that carries the slotted name boards on raised ribs or lugs near the end. The lugs and slots of the boards are alternately set at greater or less distance from the ends of the roller to take up the boards in regular manner. The roller is revolved by a loose pulley and pawl, actuated by a connecting band and spring.

### NEW HOUSEHOLD INVENTIONS.

IMPROVED DEVICE FOR HEATING AIR FOR FURNACES. Charles Thonger, Courtright, Canada.-The object of this invention is to utilize some of the waste heat of a boiler furnace for heating the air supplied to the furnace for the support of combustion. As applied to a locomotive boiler, the smoke passes through the boiler flues to the smoke box, as usual, thence back in a casing, covering and surrounding the upper part of the boiler. The tubes terminate in a breeching, from which the smoke escapes in vertical tubes, which form the smoke pipe, and are surrounded by a casing, down which the air for feeding the furnace passes to the

which the several wheels are mounted on short independent axles. For particular construction and arrangement of parts, see patent.

# IMPROVED COMBINATION LOCK.

Thomas McClanahan Seaton, Parsons, Kan., assignor to himself and John Adams, same place.-This invention consists in making the tumblers of a lock with points that work in the slot of the bolt, and causing the disk knob to slide in a slot of the plate.

### IMPROVED MECHANICAL MOVEMENT.

Charles Sandermann, Elizabethport, N. J.-This is for changing reciprocating rectilinear into continuous rotary motion, and is applicable to revolve the shaft of screw propellers, and for other purposes. A reciprocating carriage has hinged stops at both sides that act on movable cam rollers, traversing on the shaft sections, with spiral twists or grooves in opposite direction, so as to produce continuous rotary motion of the shaft by the reciprocating motion of the cam rollers.

# IMPROVED ROTARY ENGINE.

Bruno Brauer, Bremerhaven, Germany, assignor to himself, Friedrich A. Schilling, Sr., and Friedrich A. Schilling, Jr., same place.-This is an improved rotary engine, in which the steam acts directly on the piston shaft, allowing the use of the same with variable expansion, and the ready reversion of the engine. It is not possible to afford a clear idea of the mechanism, which embraces several new and ingenious devices, without the aid of drawings.

farm, or other gate that extends across the track and is automatically opened and closed by the trains. It consists of swinging lateral gate sections, that are thrown up to the outside of the track by the depression of the bearing rails.

#### IMPROVED HOSE COUPLING.

Calvin L. Martin. Portland. Me.-This consists of two or more spring catches on one section to spring over a flange on the other. The said catches have a lever and a cam rocker, by which to detach them from the flange readily when the hose is to be uncoupled.

# NEW CHEMICAL AND MISCELLANEOUS INVENTIONS.

# IMPROVED SOLDERING IRON FURNACE.

Edward G. Adams, Cohoes, N. Y.-This consists of a vertical fire box with a center flue and a hood, so arranged over the fire bed that an open space is provided in the coal for the irons. The heat is thus made to pass directly against the irons, so as to warm them quickly.

### IMPROVED CARBURETER.

James T. Stewart, Los Angeles, assignor to himself and James Wilson, of same place.—This consists of an air drum moving in a water tank, and forcing the air through a connecting pipe into a float filled with gasoline. The gasoline pan is placed into a gas holder filled with water, that raises the pan to keep the air pipe aiways in the gasoline.

casing on the boiler containing the smoke pipes, and to a jacket at the rear. Thence it passes along the boiler to the ash pit.

#### IMPROVED GAS BURNER.

Victor Zeis, New York city.-This consists of a carbonizing and pressure-regulating attachment for gas burners, made of a hollow vessel of copper, with a socket to attach to the fixture. A gas tube extends from the socket up to the upper part of the interior; and there is a burner at the top, and a tube extending from it nearly to the bottom. A bell-mouthed tube extends from a point near the top of the burner down through the cap into the carbonizing chamber, for the purpose of deflecting the gas, and causing it to descend and mix with the hydrocarbon vapor before passing through the perforations of the pipe leading to the burner.

# IMPROVED AIR COOLER.

William E. Richardson, Buffalo, N.Y.-This consists of a pan or ube to contain ice, arranged in a surrounding case of non-conducting material. There is a space between the two, into which cold air from within the pan may pass through openings in the sides in the bottom of the latter, and also from a coil of pipe entering the pan from outside, and discharging into said space. From the space it may be conducted to cellars or other rooms or places for cooling. It is adapted to many purposes for which low temperature is required, effecting a great saving of ice. The inventor claims that he can cool a room 40x40 feet and 10 feet high, with a bout 1,500 lbs. ice per twenty-four hours.