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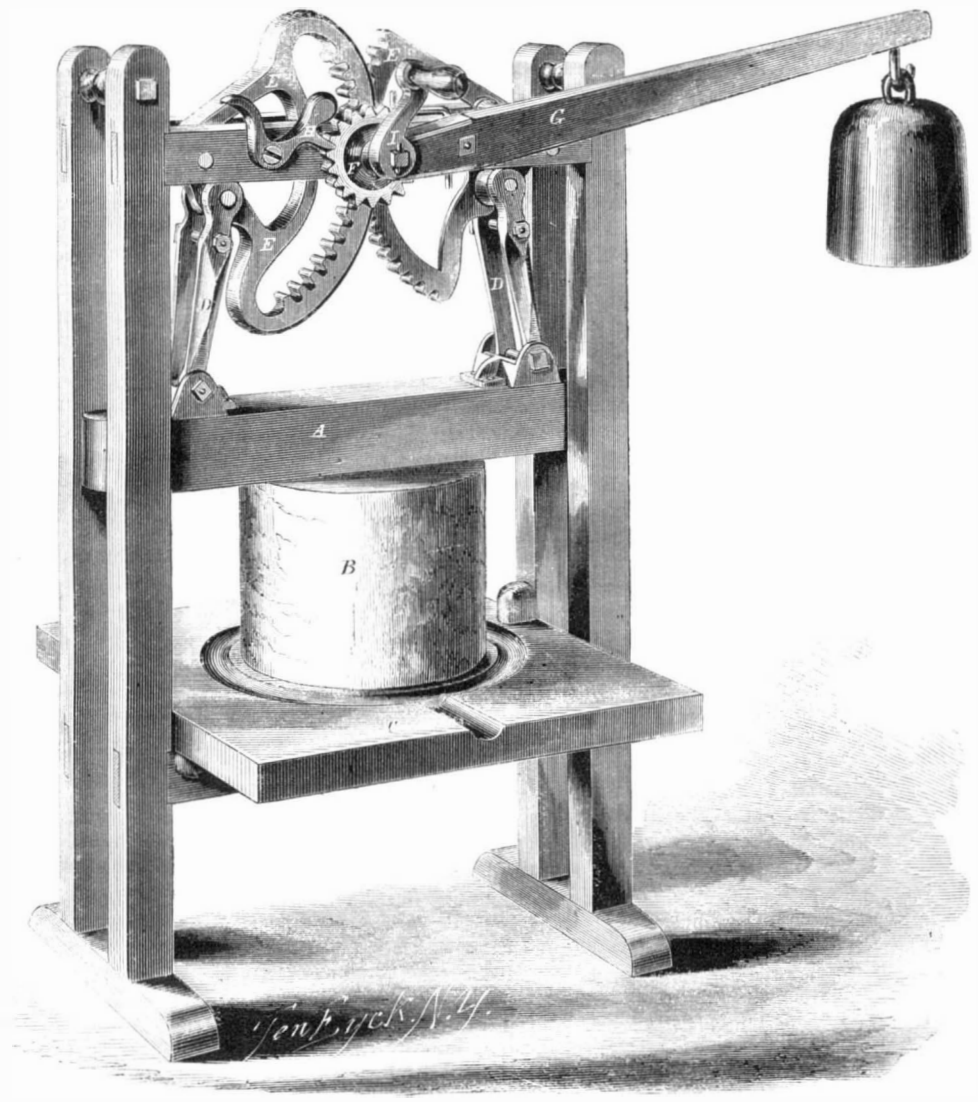
Improved Toggle-Joint Press.

There is no other mechanical device so admirably adapted for pressing cotton into bales and similar purposes as the toggle-jointed lever. As the resistance to compression rapidly increases with the reduction in the size of the bale, it is important that the multiplication of the power should increase in about the same proportion; and this is effected admirably by the toggle joint. This principle has long been well understood, and extensively applied in large establishments, but it has been strangely neglected in small presses for common purposes, as the pressing of cheeses. The annexed engraving represents a press in which the toggle joint is combined with the compound lever in a way to multiply the power a great many fold, while provision is made for rapid working in cases where great power is not required; the whole being arranged in a simple manner so as to produce a compact, powerful, cheap and convenient press. The cut shows the press as arranged for a cheese press, but it may be readily adapted for pressing hay, cotton or other material in bales.



OYSTON'S TOGGLE-JOINT PRESS.

Within a strong frame the follower, A, is fitted to move up and down in the usual manner; the cheese, B, resting upon the table, C. The toggle levers, D D, are connected at their lower ends by pivot pins to the follower and at their upper ends to the segments, E E. One of these segments is geared upon the outer edge and the other upon the inner edge of its rim, and these gears mesh into a pinion which is situated between the upper timbers of the frame. It will be seen that if this pinion is turned in one direction both of the segments will be carried down, and that this motion will carry the upper ends of the levers, D, outward; the radial arms of the segments acting as the upper levers of the toggle, and pressing the follower down with great force.

To turn the pinion its axle is brought through the timber of the frame and the pinion, F, is secured rigidly to this axle. The lever, G, is secured loosely upon the axle outside of the pinion, F, and a pawl is attached by a pivot to the inside of the lever in such place that when turned into the proper position one end will catch into the teeth of the pinion, F. Then by moving the outer end of the lever, G, up and down, the pinion F, will be turned, carrying round the inner pinion which is upon the same axle and which meshes into the gears upon the segments, E E.

One of these segments is geared upon the outer edge and the other upon the inner edge of its rim, and these gears mesh into a pinion which is situated between the upper timbers of the frame. It will be seen that if this pinion is turned in one direction both of the segments will be carried down, and that this motion will carry the upper ends of the levers, D, outward; the radial arms of the segments acting as the upper levers of the toggle, and pressing the follower down with great force.

A pawl, H, holds the pinion F, from turning in either direction, depending upon the end of the pawl which is turned into connection with the wheel; and thus the follower is secured in any desired position.

For turning the segments, E E, rapidly when but little power is required, the axle of the pinion is prolonged outside of the lever and is mounted with a crank, J.

The working parts of this press may be made of iron with iron bearings; ensuring perfect working and great durability. The beam or follower has a perfectly horizontal motion or position in its descent producing a symmetrical cheese or bale without any trouble. As a cheese press it is being extensively used in Central New York, having taken the first premiums in the principal cheese counties of the State. It is also well calculated for operating with steam, water or horse power, by substituting a pulley and belt for the crank and lever, and it is well calculated for pressing hay, cotton or any other elastic material.

The patent for this invention was procured through the Scientific American Patent Agency, May 22d, 1860, and for the purchase of State or county rights, or for any further information, the inventor, Charles Oyston, may be addressed at Little Falls, N. Y.

Steel Rifle Barrels.

In the "New American Cyclopedia" it is stated that the steel barrels of the Whitworth rifles are of such great strength that it is scarcely possible to burst them with 120 grains of powder, the regular maximum charge. Into a barrel of 0·49 inch bore and the barrel 1 inch in diameter at the breech, a leaden plug 18 inches long was rammed down tightly upon the charge. When the charge was exploded the bullet expanded and stuck fast in the barrel, and all the disengaged gas passed out by the touchhole.

Coloration of Iron.

M. Thirault, pharmaceutist of St. Etienne, has been investigating the natural oxides of iron. In addition to ordinary rust, there is another oxide (the ferroso-ferric oxide) but slightly susceptible of alteration. Iron covered with this latter is protected from rust even in moist air. This varnish is produced by the use of the following mixtures:—1. Chloride of mercury and salammoniac. 2. Perchloride of iron, sulphate of copper, nitric acid, alcohol and water. 3. Per and protochloride of iron, alcohol and water. 4. Weak solution of sulphide of potassium. These solutions are successively, and after the previous application has become dry, applied. No. 3 is applied twice; a bath of boiling water follows Nos. 3 and 4. The shade of color is fixed by means of active friction by a piece of woolen goods, and with a little oil. The shade of color imparted is of a beautiful black, uniform in appearance. This process is used in the manufacture of arms at St. Etienne; and by it have already been colored, 11,000 barrels and bayonets of English guns, 100 Egyptian guns and 6,000 double French guns for the voltigeurs, and also the saber scabbards for the gendarmerie of the Department of the Loire. The price does not exceed forty centimes for each arm. Thirault is now employing his process on different articles of hardware, machines, &c.

NOTES ON MILITARY AND NAVAL AFFAIRS.

REPORTED CAPTURE OF NEW ORLEANS.

The Richmond *Enquirer*, of April 26th says :—

The following telegraph from Mobile, dated April 25th, was received in Richmond at 11 o'clock, P. M :—

"The enemy passed Fort Jackson at 4 o'clock yesterday morning.

"When the news reached New Orleans, martial law was put in full force, and business was completely suspended.

"All the cotton and steamboats, excepting such as were necessary to transport coin, ammunition, &c., were destroyed at 1 o'clock to-day. The operators bade us goodbye, saying that the enemy had appeared before the city, and this is the last we heard from the Crescent City.

"This is all we know regarding the fall. Will send particulars as soon as they can be had."

If this news should prove to be correct it will be the most important of any since the commencement of the war. New Orleans is not merely the largest city in the seceded States, but it is several times larger than any other, and its capture would doubtless result in giving us the entire control of the Mississippi. The latest authentic intelligence that we have from that vicinity was brought by the steamer *Connecticut*, which left the mouth of the Mississippi on the 12th of April, and of course reports the operations of our forces up to that date.

A large fleet under the command of Commodore Farragut entered the southwest mouth, or "pass," of the Mississippi for the purpose of capturing New Orleans, which is situated 100 miles up the river. There was great difficulty in getting the larger vessels over the bar at the mouth, and about three weeks were consumed in the operation. The last vessel passed the bar on the 11th of April. The fleet embraces Com. Porter's 21 bomb vessels, a description of which has already appeared in our columns.

The principal defenses of New Orleans against an attack by the river are two forts, situated nearly opposite to each other upon the two sides of the river, about two-thirds of the way from the city to the Gulf. The one on the west side is Fort Jackson, and the other is Fort St. Philip. They were both built by the U. S. government, and were seized by the rebels on the 10th of January, 1861. Some of our vessels that first passed the bar, were sent up the river on the 28th of March to make a reconnoissance of the enemy's position, and discovered that a massive chain had been stretched across the river below the forts, supported by hulks filled with cotton so that they could not be sunk ; while several gunboats and armed rafts were ready to aid in the defense, and both shores were lined for a long distance with masked batteries.

General Butler had embarked his army from Ship Island, and it was supposed that he would land on the shore of the Gulf, some three miles to the east of Fort St. Philip, and aid in the attack.

All these facts we learn positively by the Connecticut. The rest of our information is from Southern newspapers. The New Orleans *Picayune* of April 16th gives this description of the commencement of the bombardment :—

For the first time since it was built, Fort Jackson—one of the strong defenses of the Mississippi river below the city—was, on Sunday last, "under fire."

Availing ourselves of a courteous invitation, we accompanied a pleasant party to the forts, leaving the city in a steamer, on Sunday night, and arriving, aftes some detention by a fog on the river, in the forenoon of the next day. Just as our boat touched the landing we heard the drum beat "the long roll," while a bugler, standing on one of the bastions, sounded the call to quarters. At this summons many of the soldiers who had been engaged outside set off at double quick, and made their way to the interior of the fort, and when we entered we found the various companies drawn up in line, or on their way to the casemates and the parapets. Soon all were in place beside their guns, ready for the threatened conflict, while General Duncan and his assistant officers were seen pacing the parapet, spyglass in hand, and casting eager glances to the point of woods about two miles down the river, and behind which they could already discern the masts of the enemy's vessels coming up.

At this moment a red flag was raised over the Confederate banner, by way of signal to St. Philip opposite, that the enemy was approaching, and immediately the blue crossed, white-starred battle flag was run up on the staffs of both forts.

Meantime, the several gunboats lying off the forts formed in readiness to take part, if need were, in the contest. One of these went down on a reconnoitering expedition, and having neared the point of woods that yet hid the boats of the enemy from our sight, returned, but not without being honored on her passage with a compliment or two from the guns of Commodare Farragut. She accomplished her return without injury, and soon a black hull was seen to emerge beyond the woods, and make her way toward the left bank of the river. Having attained what she probably considered an eligible position for her purposes, she came round, and presented her broadside to the fort, being then about two miles distant.

A few moments of eager expectation, and a flash, followed by a puff of smoke, was seen to issue from one of her guns, and then there came whizzing and hurtling through the air—heard by all, and seen by many in its course—the first shot ever fired at Fort Jackson. It was a very creditable line shot—a shell—and passed critically near the position of those who were watching its destination. It passed over the fort, and fell between its walls and the river, smashing a small foot bridge and making a formidable splash in the mud and water thereabouts. The next was aimed with about the same degree of precision, and fell beyond the walls, within a few feet of the outer bastion, facing the river. Some portions of this exploded shell were secured by the spectators as relics. We have one we should be pleased to show any curiously-inclined friend.

Some twelve shells in all were bestowed upon us from different positions in the course of the forenoon, including one fired from the screen the woods afforded, which we took for a mortar shell. This described a lofty aerial curve, and when in mid air exploded, the fuse being too short to carry it to its desired goal. Two of the shots came in very dangerous proximity to our pretty steamer, which lay at the landing, one passing over the pilot house, and the other dropping into the water just abaft the stern. Another passed clear over the river, beyond St. Philip, into the prairie, and others were thrown, but like the rest, without accomplishing their hostile intent.

All this of course was done mainly by way of "getting the range," though it is not to be doubted that every shot was intended to tell. From St. Philip some six or seven of the enemy's vessels of different classes were plainly to be seen, and from Jackson the masts of the flagship of the fleet, with the "gridiron" flaunting at the peak, were visible over the tops of the wood.

There were but three responses made on our side to these repeated compliments of the enemy. But these were all most elegantly turned. After the gunboat that opened the ball had amused herself awhile in this way, a 7-inch rifled gun was brought to bear on her, and, though not as effectively as desired, yet showed good practice, and flatteringly prophetic of a "better next time." At all events, the enemy deemed it prudent to retire for the time ; and, as he was making his way across to the point of woods, to seek once more his leafy shelter, he was greeted with two more messengers that very closely neared, if, indeed, one of them did not hit him.

The Richmond *Dispatch* of April 27th, one day later, says :—"The fearful state of suspense in which the city existed for two or three days is at last ended. New Orleans is in possession of the enemy. It was evacuated by Gen. Lovell. who has removed his forces to Camp Moore, on the Jackson Railroad."

The report of the capture is also confirmed by deserters at Corinth and at Yorktown, and we have the strongest hopes that the good news is true.

CUTTING OUT A REBEL STEAMER.

Early in April information came to our fleet that the rebel vessel *Florida*—one of those smart little steam craft which are so fond of running the blockade—was up the Apalachicola river, ready to sail out the next day. The captain of the sailing bark *Pursuit* was despatched to capture, and went by night a little distance up the river. All was still and dark. There were no lights on the shore, and the rebels, if around, were too fast asleep to hear the casting off anchor of the sloop and the embarking of her crew in small boats. With muffled oars they proceeded swiftly up the stream, until, after running some two miles, they came in sight of the little town of Apalachicola, and the dark black hull of the steamers lying near the wharf. Everything was quiet. Swiftly and surely, and so still that they could hear the night insects chirrupping on the shore, the Union sailors in their little boats neared the steamer. A minute more and they were on her deck. The vessel in its fancied security was almost deserted, though laden with cotton and expecting to run the blockade in a day or two. Only the engineers were on board, and they were asleep till waked up by our men. Deeming it best to make the most of the new affairs, these gallant engineers consented for a consideration of $200—Federal, not Confederate money—to sail the steamer out to the Federal fleet. She arrived out in safety with the *Pursuit*, and was sent to Key West as a Federal prize. There is reason to believe that the good cotton shippers of Apalachicola were both surprised and disgusted to find that their vessel and cargo had disappeared in a single night as mysteriously as Aladdin's palace.

GREAT BATTLES EXPECTED.

General Halleck has taken command in person of the Union army before Corinth, and is advancing steadily towards the enemy's intrenchments. Some deserters say that the rebel army in the town numbers 80,000 and that they will fight desperately, while others say the place is being evacuated. Nothing is more uncertain than anticipations in regard to military operations, but it would now seem that the fate of the rebellion is to be staked on two great battles, one at Corinth and the other at Yorktown. Gen. McClellan telegraphs that everything at Yorktown is going on satisfactorily.

MISCELLANEOUS.

Commodore Foot is prosecuting the bombardment of Fort Wright on the Mississippi, and Gen. Burnside's forces continue to beleaguer Fort Macon. By the *Connecticut* we learn that all of the towns on the west coast of Florida are in our possession, and that the enemy's works at Pensacola have been deserted. The Union cause is also making steady progress in New Mexico and along the western frontier. We add a few scattered incidents.

The sharp shooting, writes a Yorktown correspondent, was marvellous. Ten men, with the telescopic rifle, kept the rebels two hours away from their largest gun. Every man who came near it was killed. It was utterly useless for that long time. The rebel commander had finally to drive up an entire regiment to the piece and man it by superiority of numbers—more gunners than could be killed. It was fired thus four times, when a shot from Kennedy's battery dismounted it. The value of sharpshooters is a demonstrated fact of the greatest military importance.

A correspondent from Tybee Island writes as follows :—Observing a party of Naval officers landing and coming toward the batteries, I joined the party and found it to consist of Commodore Dupont and accompanying officers. I accompanied them in their tour of observations and heard their remarks. They were unqualified in their admiration of the construction of the batteries, and on coming to Battery Scott, the Commodore, stopping and facing his officers, said, "I consider the disabling and taking of this strong fort the most remarkable circumstance of the whole war, as it has shown to the world that forts cannot withstand the improvements in projectiles. In the short space of 30 hours it has been utterly disabled. The result must revolutionize the whole art of war, and it is no use to build forts any more if they can be so easily reduced.

Speaking of the damage to the *Merrimac* in her fight with the *Monitor*, the Richmond *Despatch* says : In some places—from the heat and weight of the shot, the plates were welded together. In other places the plates were broken, but not broken through, and the damage was repaired by taking off the injured plates and putting on others. Her prow, which was made of cast iron, was broken when she ran into the *Cumberland*, but she supplied herself with a better one.

A letter in the *Marblehead Ledger* describes a shrewd stratagem successfully employed by Capt. Gregory of the United States brig *Bohio*, employed on blockading duty in the Gulf of Mexico. On the 8th inst., a schooner was discovered far away in the distance,

which, on the *Bohio* displaying the stars and stripes, tried to escape. All sail was crowded on the *Bohio*, but without gaining on the strange craft, which proved to be a fast sailer and beyond the reach of the *Bohio's* guns. The *Bohio's* sails were then wet, when a slight gain was made. At last the captain resorted to strategy, and rigged a "smoke stack" amidships, and built a fire, and soon had "steam on." As soon as the stranger saw this she hove to, thinking the *Bohio* was a steamer and would soon catch her. On boarding her she was found to be the *Henry Travers*, of Nassau, N. P., with a cargo of coffee and soap, with which she intended to run the blockade. She made a nice prize worth $50,000.

Adams & Co. have already forwarded from the Division of General Burnside, at Newbern, N. C., the sum of $450,000 for the families of soldiers principally located in New York and New England, and there is more to come.

An army of 600,000 men carry on their shoulders 15,000 tuns, and eat 600 tuns of provisions and drink 1,200 hogsheads of water per day.

New Plans for Defending our Harbors.

The subject of the defence of our harbors and coasts has been referred by the House of Representatives to a select committee, who have just made an elaborate report. After reviewing at length the history of our seacoast defenses, and considering their inadequacy to protect our ports against the new iron-plated ships, the committee ask, "What is necessary then to make our defenses satisfactory—invulnerable to the attacks of a fleet composed of as many iron-clad vessels as any nation, without extraordinary effort, could readily concentrate against them?"

To this important question they give the following answer :—

1. The creation of adequate means to exclude from our harbors hostile ships, armored vessels included.

2. The providing of suitable means to detain invading armies on shipboard, when near important ports, a sufficient time to enable an army of the United States to be transported to the point assaulted.

3. The construction of channels in which to convey gunboats from the Gulf of Mexico up the Mississippi and Illinois rivers, and from the Atlantic ocean up the Hudson river, into the lakes, and from one lake into any other.

4. The creation of a fortress on the river St. Lawrence, or at the foot of Lake Ontario, of a capacity and power fully equal to, or superior, to that at Kingston, on the opposite shore ; also fortifications on the Niagara, or at the foot of Lake Erie, of equal capacity.

5. The construction, for the protection of the Pacific ocean frontier, of a first-class military communication between the river Missouri and the bay of San Francisco.

6. A decided increase in our means of building and repairing vessels-of-war ; of manufacturing, testing and repairing ordnance and small arms of all grades ; and of making and testing projectiles of all kinds, and for every branch of the service.

7. The duplication or enlargement of the military and naval academies immediately after the extinction of the rebellion and the reëstablishment of peace. And

8. The constitution and permanent maintenance of an army and navy sufficient in numbers and excellence to command respect both at home and abroad —a respect based on reasonable assurance of our physical ability to promptly repress domestic insurrection and to repel foreign aggression.

Probably the remedying of the defects of our present system of defenses, which recent events have revealed to us, will not, necessarily, be very expensive. The remedy may possibly be found in a few additional forts, in armoring with iron both the old and the new ones, and arming them with the heaviest ordnance attainable by art. Besides these changes, it may be found necessary to add iron-clad floating batteries and steam rams in aid of the forts ; and also, in times of danger to anchor rafts entirely across the channels leading into the harbors, or close them with chain cables. The rafts, properly placed, would arrest the progress of hostile vessels when in front of the forts under the direct fire of their guns. Thus detained, the ships must retire or consent to be destroyed ; for it is not at all likely that a ship can be constructed possessing as much power as can be given to a first-class fortification.

Possibly an entirely new system of defenses may be found best ; this, however, is scarcely to be expected, even in this age of wonderful mechanical contrivances. Being purely a question of engineering, and the United States having a corps of engineers and of naval officers eminently worthy of confidence, the committee recommend the reference of the subject to them, with directions to devise a plan which, when fully executed, will enable the United States to exclude hostile fleets from all important harbors on our several water frontiers.

They also drop the following hint in regard to some strange and mysterious plan of defense which has been submitted to their consideration :—

The committee will not withhold an expression of opinion that a powerful, perhaps entirely adequate, means of defense, original in character and simple in application, may be found to repel the most powerful fleets and armaments. We have reason to believe that this will be found to be true, though an allusion even to the nature and character of these plans, some of which are now under examination, would be premature.

Sewing Machines in England.

The London *Engineer*, in presenting some statistics respecting sewing machines, states that up to the present time there have been about 350,000 sold in America and Europe, of which number 250,000 were made in America and 100,000 in England, France and Germany. The number of sewing machines now in use in Great Britain and Ireland is 15,000 and the amount of capital invested in the business is about £100,000 ($500,000). The average weekly sale of these machines in Great Britain is about 150 ; about 600 mechanics are employed in their manufacture, and about 15,000 females in operating them. Each machine does more work than five needle women, and the number now used add about $5,000,000 annually to the wealth of England in comparison with hand sewing. About half the number of such machines running in England were manufactured in America. In 1861 about $200,000 were paid for American machines. In London there are eleven stores exclusively devoted to their sale, and only six stores for English made machines, so that about twice as many American machines are sold in England as those manufactured in that country. This is undoubtedly owing to their superior character. The sewing machine manufacture originated and was developed in America. Our mechanics have acquired great skill and experience in making them, and besides this, our inventors have invented a great number of machines, which may be properly denominated new tools, for fabricating different parts of sewing machines in a superior manner. Thus American manufacturers of sewing machines possess special advantage over those of any other country. A quick seamstress makes about 40 stitches per minute, sewing machines make from 300 up to 500 per minute and some more than this. Those machines which are employed in sewing leather and canvas run slower, because the work is heavy. The best machines stitch about a yard of linen per minute. "In the approaching Great Exhibition," says the *Engineer*, "we do not expect to find any article which will attract around it a larger crowd of visitors than the sewing machine."

The manufacture of needles for sewing machines, forms an important and distinct branch of business. The eye-pointed needle with a groove on each side is as essential to the success of the sewing machine as the looper or needle carrier. The grooves in the English needle are stamped out ; those in American needles are cut out.

Ward's Semaphoric Color Signals.

We have received from A. T. Ward, of Philadelphia, a pamphlet giving a description of his system of signalling. The system is the result of a very happy conception, and appears to us that it must be exceedingly convenient and efficient in practice. No description of it could be made intelligible without illustrations, and the necessity of printing these in colors precludes the possibility of giving them in our paper. Any one interested in the subject may write to Mr. Ward for one of his pamphlets, which contain the colored illustrations.

Canadian Railways.

There were sixteen different railways in operation in 1861, making 1881 miles in Canada, and 227 miles of extension into the United States—to Portland and Detroit ; in all, 2,108 miles of railway. There is no double track, but 249 miles of sidings, or 10½ per cent of the main lines. There were 112 miles in course of construction. The Great Western has 445 miles, the Grand Trunk 1,092, the Buffalo and Lake Huron 162, the Northern 95, Montreal and Champlain 72, Port Hope 56½, Cobourg 28, Ottawa and Prescott 54, Brockville and Ottawa 63½. There are 840 bridges, of which 672 are wooden. 147 of iron, 11 of brick or stone, and 10 swingbridges—making 94,361 feet of bridges, or about 48 miles in all. The total amount expended upon Canadian Railways up to the end of 1860, was, in round numbers, 97 millions of dollars, and the average cost per mile, $19,218. The amount of capital stock paid in on all the railways is over 38 millions of dollars. The total earnings of all the roads were $6,722,666 for the year—total expenses, $5,675,500. The average cost of repairing engines and cars per mile was nearly 8 cents—average cost of repairing the permanent way and works was nearly 17 cents per mile—and the average cost of fuel was six cents per mile. The average speed of express trains was 24 miles per hour, and of freight trains 13 miles per hour. There were 6,606 persons employed on all the railways. There were 394 engines on all the roads, 57 of which were built in Canada, 229 in the United States, and 109 in Great Britain. There were 250 passenger cars, 418 baggage cars, 3,281 freight cars, 2,593 platform cars. The Great Western has cost over 25 millions of dollars. The total expenditure of the Grand Trunk up to December 31st, 1860, was $69,998,950. The cost of the Victoria Bridge was $6,599,300. The bridge was tested by drawing over it 18 platform cars loaded with stone, and drawn by two engines. The train was long enough to reach over two spans and weighed one tun to each lineal foot. Under this weight the deflection of the bridge was only from five to seven-eighths of an inch. The bridge is pronounced by Mr. Keefer the finest specimen of engineering skill and workmanship in the world.

A Subterranean Railway in London.

A subterranean railway is now in an advanced state of construction, running about four and a half miles under the city of London. It commences at Victoria street, in the midst of what was formerly a disreputable thoroughfare, but is now a common center for the Great Northern, the London, Chatham and Dover, and the Metropolitan lines. From that point it passes eastwardly, having a large number of intermediate stations. On the occasion of a recent trip made through a portion of its length, the air was found to be perfectly sweet, and free from all unpleasantness or dampness. The locomotives used condense their steam and consume their own smoke, so that neither gas nor vapor is perceptible. The surface of the rails is made of steel. The line is made for two gages, and it has a double track throughout. The carriages will be roomy, well ventilated, and lighted with portable gas. It is expected that the road will be opened about the middle of June.

THE NEW MATERIAL "ADAMAS."—The London *Engineer* says :—The substance "Adamas," noticed in the *Engineer* upwards of two years ago, is now being extensively applied to a variety of purposes. It consists of silicate of magnesia, calcined, molded, and baked to any required shape. At Messrs. Grissell's foundry a 4-feet fan, making 1,000 turns a minute, has been running on Adamas bearings ten hours daily for a considerable time. A frame, representing a section of a throstle, has been prepared for the exhibition, and in which the spindles make 6,000 revolutions a minute in Adamas bearings, and in every case the surfaces remain perfectly cool.

LOSS OF GOLD IN SULPHURETS.—A correspondent of the London *Mining Journal* states that while on a recent visit to Clunes, Australia, he took samples of the refuse sulphurets of gold washings belonging to three companies, and obtained from them gold at the rate of 28 oz. 5 dwt.; 29 oz. 9 dwt., and 30 oz. per tun. What a loss of gold by the imperfect processes employed for extracting it!

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The regular weekly meeting of the Association was held at their rooms at the Cooper Institute on Thursday evening, April 24th, the President, Prof. Joy, in the chair.

During the half hour devoted to miscellaneous business the subject of the

REDUCTION OF IRON

was introduced by

Mr. CHURCHILL—I was not present at the last meeting, but I see by the records that Prof. Seely stated that the iron in the cylinder of Mr. Rogers's apparatus could not be reduced from the ore by the carbon. I have here on the blackboard the formulae of the reactions. I will take the protoxide of iron as that will illustrate the changes just as well, though this is not the oxide operated on. A little atmospheric air would get into the cylinder, and this with the carbon and the oxide of iron will give us C, Fe O+O N_2. The carbon would combine with the oxygen of the air to form carbonic oxide CO,Fe O throwing out the nitrogen as producing no effect. Then the iron would be reduced by the carbonic oxide, which would be converted into carbonic acid CO_2 Fe. The carbonic acid being in a nascent state would be immediately reduced by the free carbon present to carbonic oxide 2CO; this would reduce two more atoms of iron, and thus the process would go on.

NAVAL WARFARE.

As this was the third evening which had been given to this subject, the discussion was rather desultory, but a few points of some interest were made.

Mr. DIBBEN—They are far more industrious in the investigation of this subject in England than we are in this country. Within a few years a commission of competent engineers has been appointed by government to examine all inventions designed to aid the public service, and whenever anything is presented which promises to be valuable, the inventor receives facilities for testing his plans. Sometimes he receives a salary while he is making his experiments, and in other cases he is allowed the use of the public dockyards. Sir William Armstrong was thus aided in the beginning of his career.

Mr. STEVENS—Some years ago I made some experiments in firing bullets through plates of different materials. I found that a bullet moving with a velocity of 1,000 feet per second would cut out a hole in a pane of glass without breaking the glass; but to cut out a smooth hole in a steel shovel blade, required a velocity of 3,000 feet per second.

Mr. DIBBEN—I think there must have been some defect in the pendulum with which the velocity was measured, as 1,800 feet per second is the highest velocity ever imparted to a shot.

Mr. ROWELL—Did you try firing candles through a board?

Mr. STEVENS—Yes, and they came out in good merchantable condition.

Mr. BABCOCK—I have tried firing candles through a board, and I have found the wicks, but I never could find the candles. Now I am up, I will remark that I learn from Mr. Parrott that he has been making some experiments with wrought iron shot, and he finds that they have no more power of penetration than those made of cast iron. They flatten against the plate.

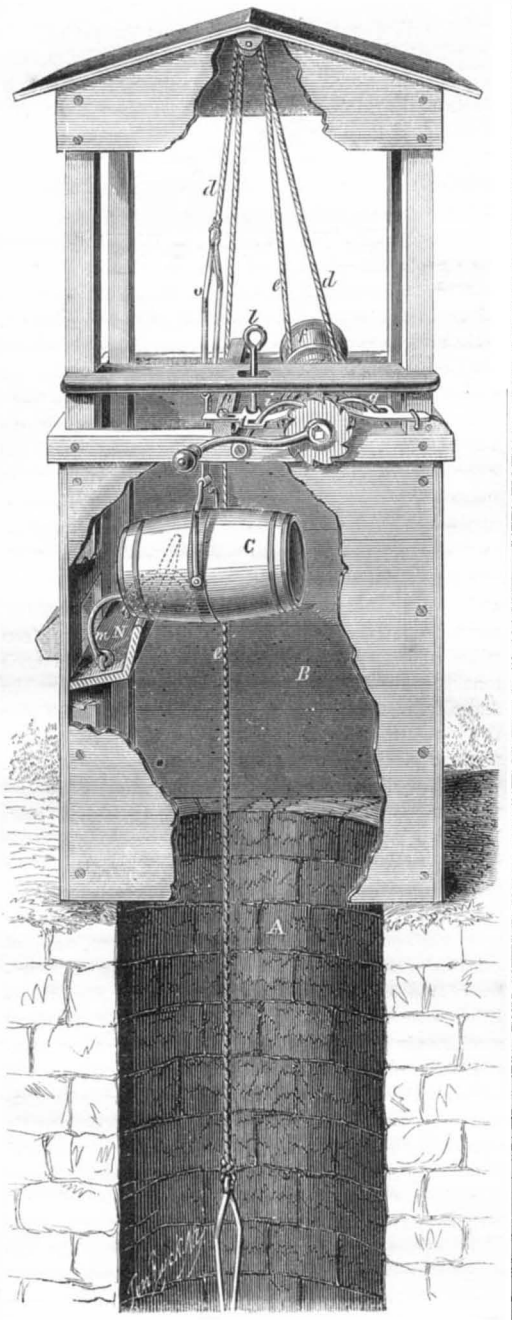
Capt. BARTLETT—I saw at Washington last week a gun of novel construction which has proved very effective indeed in some of our skirmishes. It is a light rifle, mounted on wheels, throwing a 1-inch bullet, and can be fired 200 times in a minute. Several of the Governors of States have ordered it to be furnished to their regiments, one or two guns to a regiment. On one occasion one of these guns was brought to bear on a squadron of cavalry at 800 yards, and it cut them to pieces terribly, quickly forcing them to fly. The charges are placed in steel cases which are placed in a hopper, and they are fired one at a time. The arrangements are such that there is no danger of the whole exploding at once.

The subject selected for discussion a fortnight hence was "Soap."

THE *Rural Register* states that the grass of lawns should not be cut too frequently, and in the first season after sowing the scythe should not be allowed to touch it.

SHEPHERD'S PATENTED WELL CURB.

The mode in which water may be raised from a well in the coolest and purest condition is by means of buckets; and where two buckets are used so that one descends while the other rises, this mode probably secures as great economy of power as any other. There is accordingly a very wide preference given to the use of buckets over all other methods of raising water, and efforts are being constantly made to render the apparatus for working buckets more perfect in its operation. The accompanying engraving illustrates a simple but ingenious and useful arrangement of pawls, by which the bucket that is filled with water is always held after it is tipped for the water to flow



out, and is also prevented at any stage of its upward journey from redescending into the well; the pawls being so connected that they may be readily shifted from their hold upon one bucket to a hold upon the other.

The engraving represents a well, A, with a curb, B, and two buckets, one of which, C, is shown; the other being near the bottom of the well. Each bucket is attached to one end of a cord, *d d*, and *e e*, each cord being carried over a pulley in the top of the curb and having its opposite end attached to a windlass, *f*, in the usual manner. Upon the shaft of the windlass are secured two ratchet wheels with their teeth set in opposite directions; each wheel being provided with a pawl, *g* and *i*. The pawls are pivoted to the timber of the curb and pass through slots in the sliding plate, *j*. It will be seen that if the plate, *j*, is slid to the right hand, the pawl, *g*, is raised from its hold upon its ratchet wheel, and the pawl, *i*, is carried down so as to engage with the wheel to which it belongs; thus holding the bucket, C, from descending. As soon as this bucket is emptied of the water with which it was filled the plate, *j*, is slipped to the left hand, reversing the position of the pawls, allowing the bucket, C, to descend and holding the other at any position in its ascent.

A hook, *m*, for each bucket is pivoted in the trough, N, and as the bucket rises, this hook catches upon its rim, holding down the side near the trough, so that as the other side is carried up by the continued turning of the windlass, the bucket is tipped in the position represented in the cut, discharging the water into the trough.

Each bucket is connected with its cord by a broad flat link, *o*, and a timber, *p*, is placed across the curb in such position that when the bucket rises the link, *o*, may come in contact with the side of the timber, and the bucket may be thus turned so that the hook, *m*, will catch it at right angles with the bail.

Where pawls and ratchets are not placed upon a windlass for raising buckets, if the hold upon the crank is lost the empty bucket descends, whirling the crank with great violence; and if a child is operating it, his limbs or even life may be endangered. But with these pawls the hold upon the crank may be released at any time and all of the parts will remain in the position which they then occupy. By means of the lever, *l*, the position of the pawls is very readily reversed, and the whole apparatus is simple, and very convenient in its operation.

The patent for this invention was granted through the Scientific American Patent Agency, April 23, 1861, and further information in relation to it may be obtained by addressing the inventor, Calvin Shepherd, at Chenango, N. Y.

THE COLORS OF COAL TAR.

Number 1.

The art of dyeing has been almost revolutionized within a very few years by the production of several most brilliant colors from artificial compounds derived from certain products of coal tar. Such colors are triumphs of modern chemical skill. The chemist takes the offensive coal tar of our gas works and extracts colors therefrom which impart beauty to the finest products of the loom. A description of these colors and their application will be generally useful and interesting. Aniline is the chief basis of these peculiar dyes. This substance was first discovered in coal tar about 1841, by Dr. Hoffman, of London, and a pupil of this distinguished chemist, W. A. Perkins by name, first produced aniline purple on a commercial scale.

Aniline is an alkaloid, and is derived from benzole, otherwise called benzine—not the improperly-named benzine of petroleum. The chemical symbol of benzole is $C_{12}H_6$. It is obtained from purified coal naphtha by careful distillation at a temperature of about 186°. Benzole is a volatile fluid—a carburet of hydrogen.

The next step in the process of producing aniline is to mix benzole with strong nitric acid in about equal quantities. A violent action ensues with a development of heat, and nitro-benzole is formed. Its chemical symbol is $C_{12}H_5NO_1$. To convert this substance into aniline, its oxygen must be displaced and two equivalents of hydrogen added. For this purpose equal quantities of it and acetic acid are mingled together, and also an equal quantity of iron filings. A chemical action takes place, the iron is converted into an oxide, two equivalents of hydrogen in the nascent state unite with the nitro-benzine and four equivalents of oxygen are driven off, leaving aniline—the composition of which is $C_{12}H_7N$—mixed with the oxide of iron. The latter is removed by two distillations in a retort. A very small quantity of fresh-slacked lime is added before the second distillation. The same result may also be obtained by using zinc instead of iron filings, and sulphuric instead of acetic acid.

Aniline is a colorless fluid; it boils at 359° and has a specific gravity of 1·028. Being of an alkaline character it combines with acids, forming salts. When combined with sulphuric acid it forms the sulphate of aniline, which is the salt used by Mr. Perkin for making his purple. Equal quantities of the sulphate of aniline and the bichromate of potash in solution are mixed together and allowed to stand until their reaction is complete, when a black precipitate falls down to the bottom of the vessel. This

precipitate is placed upon a filter and washed with soft water to free it from any sulphate of potash that is in it, after which it is dried. It now contains some resinous matter which is injurious to its coloring qualities. This resin is removed by digesting it several times in purified naphtha, or until it ceases to give a brown color to the naphtha. After this it is boiled with alcohol and distilled, so as to drive off the whole of the alcohol. The product left in the retort is a beautiful bronze-colored substance constituting the commercial purple of Perkin, and it produces the same color as that which is called *magenta*. Other metallic salts, as well as the bichromate of potash, when combined with aniline, will produce purple colors. This color in its dry bronze state is only slightly soluble in water, but it dissolves freely in common alcohol, or methylic alcohol (wood spirits made by distilling birch wood, &c., in retorts). This purple color possesses the valuable property of not being affected with light, acids or alkalies. Wool, silk and cotton are dyed with it by the following processes :—

An alcoholic solution of this bronze substance (a very small quantity is required) is placed in a hot-water bath, slightly acidulated with tartaric acid, and the whole thoroughly stirred. The white wool to be dyed is now placed in this and handled rapidly, the temperature being maintained at about the boiling point. In a short period the desired shade will be obtained. Small quantities will color lilac shades, a larger quantity a purple. Silk is dyed in the same manner, only the temperature of the bath is lower. By adding a small quantity of the sulphate of indigo (dyer's chemic) to the bath, a beautiful lavender color is produced. An endless variety of shades can be dyed in this manner on silk and wool, by simply using different quantities of the aniline purple and sulphate of indigo. The process of coloring cotton with aniline purple, is more complicated and requires greater skill than the coloring of silk or wool. The cotton is first handled then steeped in a tannin solution, such as that of an extract of sumac, for about two hours, after which it is handled in a weak solution of the stannate of soda for about one hour, when it is run through a weak "sour" of dilute sulphuric acid and rinsed afterward in cold water. When squeezed or wrung it is ready for the coloring operation, which is performed in a warm bath, exactly as for the silk, only it requires about double the quantity of coloring matter for the same quantity of cotton. Aniline purple may also be dyed on cotton by preparing it first with several semi-soapy solutions, by what is called the Turkey-red process, also by giving it a mordant of the acetate or nitrate of lead.

Minks as Insect Catchers.

A correspondent of the *Rural New Yorker*, who seems to make a business of raising minks for their fur, relates the following in regard to their catching grasshoppers and bee-moths :—Two years ago last May I caught seven young minks. I made a pen of boards near my bees, twelve feet square, and put them in it. About the first of July grasshoppers would occasionally sail in, and they would jump and catch them very quickly. It soon became sport for boys to catch grasshoppers and throw them on the side of the pen, to see the minks jump and catch them. Hearing the same jumping at night, I went out to see what was going on, and I found they were catching millers. The millers were so thick about my bees that I could catch from thirty to forty a night in a pan of buttermilk, and now I have no millers about my bees. My minks cannot climb a rough board fence four feet high. They have young once a year—from five to eleven—and before I take off their pelts I keep them in the dark for about a month, to make them darker than the wild ones.

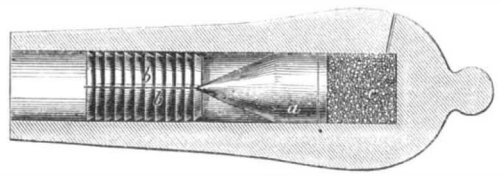
A TALL specimen of the forests of Vancouver's Island has been sent to the World's Fair, in the shape of a tree 242 feet in hight. As it cannot be accommodated in the exhibition building, it is to be raised on the grounds of the Royal Horticultural Society.

PROF. BOND, of Cambridge, has made a series of observations to determine the relative amount of light received at the earth from the sun and moon, from which he concludes that the sun's light is 470,980 times greater than that of the moon.

Correspondence

Improvements in Blasting.

MESSRS. EDITORS :—When I was in Pennsylvania, in the fall of 1859, visiting the mines, I invented an improvement in blasting, which consists of a wedge with a cylindrical head, to fit the drill, with a vent through its axis, and several pairs of half cylinders, square at one end and terminated by wedges at the other. When two are laid together the creases in the axis form a vent, and the annular notches on the surface bristle forward, or toward the wedge end.



The wedge is put next to the powder, so as to form a piston. A pair of half cylinders are next put in, so that the point of the wedge comes slightly between the two, and so on until the bore is filled.

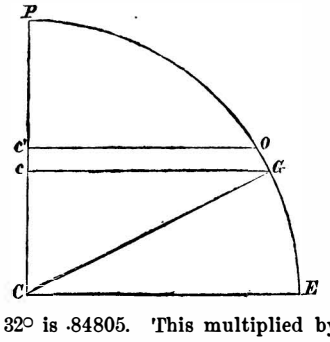
After the battle of Bull Run I thought that those batteries that were silenced, or taken and left, might have been destroyed by a projectile constructed on the above-mentioned principle, as illustrated in the subjoined drawing. *a* is the wedge, *b b* the semicylinders, and *c* the powder. Perhaps such a shot could be fastened to a pole and tucked into the guns of an iron-clad boat, from another section of a cannon with the shot.

H. H.

Deviation of Balls to the Right.

MESSRS. EDITORS :—In the abundance of reading and conversation on rifles, cannon and projectiles, common now-a-days, it strikes me that one important cause of inaccurate firing is greatly overlooked. I refer to the effect of the earth's rotation upon the flight of a projectile. It is clear that the gun and the ball turn eastward with the same velocity as the point of the earth where they stand. As the ball will retain this velocity, if it appear that the object moves eastward at a different rate, then will the ball, supposing no other cause of error present, be found farther to the east than the object aimed at, or not so far. True, compared with the magnitude of the earth the longest range seems small, and can there be an appreciable difference between the velocity of rotation of places but 2 or 3 or 4 miles apart? Consider that from the equator, where the velocity is 1,000 miles an hour to the poles, where it is nothing, is only one-fourth of the distance round the earth, and look more closely at the case.

If G be the station of the gun in 32° North Latitude, it will rotate in the circle whose radius is *c* G. But *c* G is the cosine of the latitude, and the natural



cosine of 32° is .84805. This multiplied by the radius of the earth, $\frac{7912}{2}$, gives *c* G in miles. The multiplier, 2, gives the diameter ; 3.1416 the circumference ; 5280 reduces it to feet—

$$.84805 \times \frac{7912}{2} \times 2 \times 3.1416 \times 5280,$$

then is the feet traversed by G in 24 hours. Suppose now the object, O, to be due north, on the same level, and at a distance of 2 nautical miles, or 4,066 yards. The cosine for the object will be .84774, and the rest of the work just as before. But let us take the difference of the cosines before multiplying, and our result will be the difference between the rotation of the two spots in 24 hours. Divide by 24, 60 and 60 and we have the difference for one second, and multiply by the number of seconds occupied in the flight of the ball, and we shall have the number of feet which G has passed to the east more than O during the passage of the ball. We have then

$$\frac{.00031 \times 7912 \times 2 \times 5280 \times 3.1416 \times 24}{2 \times 24 \times 60 \times 60} = 11.3 \text{ feet},$$

and by so much will the earth's rotation throw the ball to the east of O. Had the gun and object changed places it would be the same amount to the west, but it is simpler to remember that it is always to the right in north latitude. Had the range been taken so as to involve a fractional part of a nautical mile, the difference of the cosines must be calculated to suit, as has been done in some of the following cases. The calculation thus spread out for explanation is too long for practice. All portions of it, except the difference of the cosines of the latitude of the gun and object and the number of seconds, are the same every time. This part once for all—

$$\frac{7912 \times 2 \times 3.1415 \times 5280}{2 \times 24 \times 60 \times 60} = 1{,}519,$$

and we multiply the difference of cosines by 1,519, and by the seconds, to obtain the deviation.

The oblique ranges may be more quickly got from the due north and south than by a direct calculation. Thus, if 11.3 feet be the deviation at south, for south-east multiply 11.3 the natural cosines of 45° = .707, and we have 7.99 feet, for the deviation when firing to the same distance in a southeasterly direction. I have taken from the "Ordnance Manual" the elevations, ranges and times, and calculate the following deviations :—

Elev'n. Deg.	*Range. Yds.*	*Time. Seconds.*	*S. Ft.*	*S. S. E.*	*S. E.*	*E. S. E.*	*E.*
10	2,720	10·98	3·56	3·29	2·52	1·36	0
20	3,842	18·92	8·66	8·01	6·13	3·31	0
30	4,836	27·50	15·45	14.27	10·92	5·91	0

These are for a 10-inch columbiad, with 10 lbs. of powder and 100-lb. shell. Latitude, 32° north.

It is noticeable that the deviation, as it is augmented both by the increased range and by the time, increases much faster than the range.

It is plain that an unnoticed cause of error will do much to put us astray in our estimate of all the causes, the wind, untruth of bore, and drift on the hold taken upon the air by a rifled missile. Worse still, with this effect it brings into disrepute all long-range firing, under the idea, to use the words of an officer, that the aim is so uncertain as to render it of little use. But to compass all the advantage of our improved arms we must understand the effect of each interference. When we have ascertained one exactly we have less trouble to get the rest. By combining and allowing for them we should be able to fire to purpose even at the longest range, and we should try to accomplish this at once, if possible, as many advantages may be lost and much injury suffered while we are feeling our way by trial to a correct aim.

H. D. G.

Philadelphia, March 31, 1862.

Another Answer to "A Young Miller."

The specific practical information called forth by the letter of our correspondent, "A Young Miller," is just the class of knowledge which we particularly prize for our pages. We suggest to other mechanics to forward us similar queries in regard to any doubtful point in their respective arts, and we will lay them before our numerous readers. We are publishing the answers to "A Young Miller" in the order in which they were received.

MR. YOUNG MILLER :—In looking over the SCIENTIFIC AMERICAN, I saw your questions, and having had some experience in the milling business I venture to give you my views on the subject. You wish to know how much draught you require in a stone of which the diameter is 3 feet 10 inches, running 135 revolutions per minute, to suit a bolt 16 feet long and 30 inches in diameter, half No. 9 cloth, and the other half No. 10. I must first tell you that you cannot regulate the quantity of grinding by the draught that you put in, nor yet by the dress, but that must be regulated by the power. If you wish to grind grain in a proper manner you must neither have too much nor too little draught, as too much will throw the grain out too quickly, before it has had time to get ground, while too little draught will keep it in the stone longer than is needed. I think one inch to the foot is quite sufficient for a stone of good quality, and if very open I would not give it quite as much, as every pore adds something to the draught. I prefer the straight furrow for these reasons, that the furrows cross more

nearly at right angles near they eye than they do at the skirt, therefore they will discharge the flour more quickly at the eye than at the skirt. This is necessary on account of the grinding surface being increased nearer to the skirt. A circle furrow acts just the contrary way, it gives more draught at the skirt than at the eye, and this keeps the stone too light of feed at the skirt, while it is crowded too much at the eye, therefore it wears the stone out of face. I think it is not so well to have the stone's staff into the eye, but to keep the face just below the staff on the eye blocks, as it makes them grind cooler and more freely. The number of furrows in a stone should be at least forty. I should prefer twenty quarters and two furrows to the quarter. Now, the bolt you speak of should bolt from eight to ten bushel per hour, if the grain is properly ground. J. T.

Dayton, Iowa, March 31, 1862.

Lake Superior Iron Mines.

MESSRS. EDITORS :—I observe frequent mention in your columns of the amount of copper produced in the Lake Superior district. Few people are ignorant of the immense deposits of copper upon the shores of that great Lake. But there is one other deposit upon those shores, of scarcely less value and importance than the copper, of the extent of which few people are aware. The total value of copper produced in 1860 from the whole Superior region was less than $3,000,000 when refined. In the same year 114,000 tuns of iron ore and 5,500 tuns of pig metal were shipped from the single port of Marquette ; this would produce above 70,000 tuns of refined iron, worth at that time, in the shape of railroad iron, at least $3,000,000 ; but this ore is usually converted into a superior quality of iron, bringing in market a much higher price.

It may be interesting to many of your readers to know that this great deposit of iron is situated at the average distance of fourteen miles from the harbor of Marquette and about eight hundred feet above Lake Superior, that an expensive railway has been constructed from the Lake to the mines, and that four locomotives are employed on that short road solely to transport the ore. The supply of ore is inexhaustible, the mining has thus far been little else than quarrying from the side of the bluff. This bluff rises at one point more than one hundred feet above the railway, a solid mass of 75 per cent ore, from whence it has only to be thrown down and rolled along the narrow "ribbons" drawn out from its own substance and dumped into vessels, which transport it to the vicinity of the great bituminous coal fields of eastern Ohio and western Pennsylvania.

Five charcoal furnaces have been built in the vicinity of the mines, and the iron, from its superior quality, has become a necessity to the railroads of the West. J. S. SARGENT.

Cleveland, April 20, 1862.

Working Steam Expansively---Our Naval Experiments.

MESSRS. EDITORS :—In your issue of April 19th, you noticed a paper read before the Glasgow Institution of Engineers, by Professor Rankine, on steam expansion and the experiments at Erie, Pa.

So far as has come under my notice, much has been written, and to little purpose, in regard to the Erie trial and the results obtained there. The circumstances attending that trial were extraordinary, and when duly examined will suffice to explain why the apparently anomalous results were obtained, and to do away with the impressions resulting therefrom.

The *Michigan*, it will be remembered, is an iron vessel, and the trial was made in the winter, when the water in which she floated was very cold (33° Fah.,) the atmosphere colder (about 30° by the same scale), and it will be found by reference to the table opposite the 22d page of the report, that a temperature of about 77° Fah. prevailed in the engine room during the trial. Now, the engine room, including boilers, occupied about fifty feet in length by almost the entire breadth and depth of that vessel, and it seems plain that the loss by radiation must have been enormous, and contributed much, of course, against expansion, inasmuch as the loss was nearly the same whether the engines were working with a large degree of expansion and small power, or with a small degree of expansion and large power.

The *Michigan's* engines have inclined, open-top, forcing air pumps with a comparatively large space between piston of air pump and foot and delivery valves, and will not, as my experience teaches me, make a very good vacuum under any circumstances There are two good reasons for this ; one, the difficulty of exhausting the air from this large space between piston and valves ; the other, the constant leakage of air through the packing of air-pump piston into this large space. In the table in the report before referred to you will find that when they were "following" $\frac{1}{1\frac{1}{2}}$ths of the stroke, the vacuum was 26·5 inches and that when they were "following" only $\frac{4}{4\frac{5}{5}}$ths of the stroke it was only 24·1 inches by the gage, and that the vacuum became worse almost exactly as the "cutting off" was shortened. Now, the reverse of this should and would have been obtained with a different arrangement of air pump. If this is so, suppose we change the figures in the table to what they should and would have been but for the peculiar arrangement of engines upon which the trial was made. Say we change from 26·5 to 27 inches when following $\frac{1}{1\frac{1}{2}}$ths of the stroke, and from 24·1 to 28·5 inches when following $\frac{4}{4\frac{5}{5}}$ths of the stroke. The mean gross effective pressures in the table will then go up from 29·8 to 30·3 lbs. in the $\frac{1}{1\frac{1}{2}}$ths column and from 8·8 to 10 lbs. in the $\frac{4}{4\frac{5}{5}}$ths column. Here you see an important gain to the power when working with the high degree of expansion, and an unimportant addition to the power when working with little or no expansion.

This is not all, the air pump and condensing apparatus, you will have noticed before this, was ample to produce 26·5 inches of vacuum by the gage when working the steam at full pressure and nearly at full stroke, and that it was very much larger than was necessary when only following $\frac{4}{4\frac{5}{5}}$ths of the stroke, thereby taxing the engines when cutting off short to the extent of about half a pound pressure on each square inch of steam piston during the entire stroke for working the unnecessarily large air pump.

During the trial, when cutting off at $\frac{4}{4\frac{5}{5}}$ths, it was probably necessary to keep the furnace doors open much of the time. If so, the fuel burnt during that time hardly gave its full effect.

It is evident no economy will result from cutting off so short as $\frac{4}{4\frac{5}{5}}$ths with so low a boiler pressure as was used there, it is equally plain that the experiments on that vessel, so far as they go to show the advantage or disadvantage of working steam expansively, are useless. ENGINEER.

Wilmington, Del., 1862.

Painting the Slides of Magic Lanterns.

The following article is condensed from letters which have appeared in the London *Photographic News :*

The vehicle for the colors is the Canada balsam (resin of the Balm of Gilead fir). The colors used are gamboge, asphaltum, burnt sienna, crimson lake (in drops) and chinese blue ; and sometimes vegetable black for vigorous touches. The various tints are got by a mixture of the above. The mode of preparation is as follows : First take of gamboge one ounce and beat it into small pieces, put them into a bottle containing two ounces of alcohol, and set in a warm place to dissolve the coloring matter—this will take two days. It must be well shaken from time to time, to assist the solution. The supernatant liquor is poured off the sediment on a warm slab of glass or marble ; the warmth being necessary to assist the evaporation of the alcohol. The color should be kept in the center of the slab with a pallet knife ; it will soon appear thick and opaque. A little Canada balsam must now be added, and well worked in, and as soon as the alcohol has all evaporated the color will resume its former transparency, and have a thicker consistency ; if a little be tried on a glass it will show the color to be a rich yellow. Next prepare the asphaltum ; it is to be dissolved in turpentine and allowed to settle. A little of the liquor may be poured off and mixed at once with the balsam. The other colors, crimson lake, burnt sienna and Chinese blue are to be ground on the slab in the order written ; as the blue is very difficult to clean off it must be done last. The colors are to be reduced to a fine powder on the slab, and a little turpentine added, with which the color must be ground as fine as possible. The quantity used, however, in each picture is so small that a little color will cover a large number of pictures.

In painting it is usual to lay on the sky pretty freely with a soft sable brush ; a black one is best, and as soon as ready, in order to remove the marks of the brush, it must be dabbed with the end of the finger, covered with a piece of kid glove. This requires practice to do well ; its object is to give that grain which will be noticed in well-painted views. Clouds must be wiped out with a piece of cork. Success in painting such slides is only attained by patience and careful working. The easel should be either a thin board or a piece of millboard, with a hole cut in it in the shape of the picture, just leaving a margin all round ; pieces of wood should be glued on to keep the glass in its place, as it will be better sloped.

The colors are best kept in little pots that have covers, such as are used for lip salve. A little water should be put over them to keep them from drying when not in use. As much as wanted is taken out for use on a piece of glass with white paper under.

To paint, or rather color photographs, let Mr. Jones, for example, have a transparent positive on glass. Supposing, then, he has a transparent positive on glass, from a fully-exposed negative—a landscape will be the most likely for him to succeed with—it must be varnished with a very hard varnish. He must contrive for himself a glass easel, under which, and lying flat on the table, must be placed a sheet of white paper, so that while he works he can see what progress he is making ; he must also sit facing the light, which will strike on the white paper, and be reflected through the picture he is painting. He must use colors ground very fine. Those only which are transparent are of service ; highly rectified turpentine, or camphene, is used as a vehicle. A clean rag must be added for wiping the fingers. Having every thing in readiness, and placed in proper position, the picture being on the easel he must begin with the sky, which we will suppose to be that of a fine day near sunset. Let him take a very little of the prussian blue on the tip of the second finger of the right hand, and dab the sky over about half way down, not caring for trees, buildings, or any thing that may run into it, but working all over it. Having, by dabbing with the finger, obtained a fine and even layer of color, wipe the finger dry on the rag, and soften the blue upwards so that the top part is the color wanted, take then (the finger being wiped clean), some madder carmine and dab it on so as to blend it with the blue, producing a gradation from blue to faint rose. Wipe the finger clean, and with a little indian yellow, blend into the rose so as to produce a golden horizon. When all is done satisfactorily, wipe off the color where not wanted, with a piece of paper. Proceed to tint the other parts of the picture with sable pencils, never putting more color than will appear clear and even, but strengthen the colors again and again if required, letting the picture dry between each coat, being very careful not to move the color already laid, finish by scraping the highest lights out with the point of a penknife, then varnish. Be very careful to avoid dust, as every speck will show. Beautiful dioramic effects may be obtained by various appliances with a little ingenuity.

Magic slides require very neat handling, highly effective coloring, and exceedingly correct outline, as they have to bear being highly magnified, when every blemish becomes exaggerated and faults in outline appear extremely rediculous.

Oil in Boxes.

The Jamestown *Journal* says oil is sent down the Alleghany river from Oil City and Tidioute, in boxes, without being barreled. They are made tight, 16 feet square, 20 inches high, and are filled from the wells or tanks along the creek ; five boxes are fastened together and run out of the creek, when twenty are fastened together to form a river fleet. This fleet is to run to Pittsburgh, where the oil is put into barrels and forwarded to market. Large quantities are forwarded, and as the cost of delivering at Pittsburgh is only 75 cents per barrel, including boxes, there is great saving in shipping it that way while the roads are so bad the other. The enterprising shippers are getting up "artificial pond freshets," when the water is not high enough without. They floated off a fleet of 137 rafts last Saturday, 88 of which were loaded with oil in barrels, the remainder with oil in bulk—an aggregate of nearly 20,000 barrels.

THE DISCOVERIES OF 1861.

[Further Extracts from Wells's Annual of Scientific Discoveries.]

GROUND ICE.

Ground ice is the ice found under the surface of the water in rivers. It has engaged the attention of men of science on account of its apparent unnatural position, and also the attention of practical men because of the mischief it may occasion by accidental obstructions, such as a branch of a tree in a mill-course, when the water is charged with icy particles. Mr. Richard Adie has published a paper in the *Journal of the Chemical Society* on this subject. He believes that he was the first to state that ground ice is formed in the coldest part of the stream, and that the small crystals, as soon as formed, are carried along by the current and submerged and entangled by plants, etc. In December and January, 1860-1, he searched for ground ice where he had previously found it ; but, although the frost was severer than it had been for sixty years past, he found it only in one locality, viz., on a stone covered over by the water of a rivulet at Duddington, near Edinburgh. Other observations have led him to the opinion that the position of ground ice is one of lodgment merely, in opposition to the notion that the water has frozen in the bed of the river, the current preventing its freezing in its natural place—the surface. In a note on Mr. Adie's paper, the eminent chemist, Dr. E. Falkland, gives his opinion that the formation of ground ice, which takes place only in rapidly-flowing streams, depends upon the fact that ice, like other crystalline bodies, deposits itself more readily on rough surfaces (freezes, in fact, at a higher temperature) when in contact with such surfaces than within the mass of liquid itself. Hence when a rippling stream is cooled to 32° ice crystals attach themselves to the pebbles at the bed of the river and form nuclei for further deposition.

THE FREEZING AND BOILING POINTS OF WATER.

M. L. Dufour has communicated to the French Academy the results of some interesting experiments showing that water and certain other substances may be maintained in the liquid condition at temperatures much beyond the point at which they usually pass into either the solid or vaporous state, by placing them in a fluid menstruum of the same density as themselves, and with which they are not miscible. Globules of water thus suspended in perfect equilibrium retain the fluid condition through a much longer range of temperature than is possible under other circumstances.

The boiling point of liquids is known to vary considerably, and to be particularly affected by the nature of the vessel in which the liquid is contained. With water the boiling point is higher in a glass than in a metallic vessel. When the surface of the glass has been specially cleansed with oil of vitriol the discrepancy becomes still more marked. When placed under the conditions of a water hammer, in which it is entirely free from air, and contained in a glass tube, Donné has shown that it may by careful heating, be raised to 135° Cent. without passing into the vaporous condition. The deviation in such cases is attributed to the force of adhesion existing between the liquid and the surface of the vessel, and the absence of air from solution.

In M. Dufour's experiments, however, the result cannot be attributed to the absence of air, or to the adhesion of the liquid to a solid ; on the contrary, contact with a solid produces an instant gush of vapor. His first experiment is as follows :—Some linseed oil is heated in a dish to 105° Cent. or 110° Cent., and a few drops of water dropped in, which sink to the bottom of the vessel. The moment they touch, a sudden formation of vapor takes place, and the globule, a little lessened, is repelled a short distance from the bottom. It again sinks till it touches, when it again boils, and is again repelled. While the globule is floating through the oil no evaporation takes place ; it is only on coming into contact with the solid that vapor is formed.

M. Dufour's next experiment consists in using a medium having the same density as water, and in which, consequently, the globules remain in equilibrium, permanently floating in the centre ; the medium being capable of bearing a temperature above 100°, and not being miscible with water. Essence of cloves, to which a small quantity of oil has been added, constitutes a fluid answering to these conditions. Water remains floating in round spheres with perfect freedom of motion in the centre of this mixture. Under these circumstances, if heat be carefully applied, a temperature far above 100° Cent. may be obtained without the ebullition of the water ensuing. 120° or 130° Cent. is frequently reached, and spheres of water ten millimetres in diameter have been thus raised to 140° and 150° without changing. Smaller spheres, one to two millims. in diameter, have been raised to 170° and even 175° Cent. : that is to say, a temperature at which steam has a tension equal to eight atmospheres (or one hundred and twelve pounds). The water used had not been prepared ; it was neither distilled nor freed from air. At these high temperatures the globules were as calm and transparent as at 10°. When the globules came into contact with a solid, then ebullition instantly ensued. If carried against the side of a vessel or against the bulb of the thermometer, a sudden formation of vapor was the result, and the globule was repelled some distance from the point. By touching the globule when at 115° or 120° with a glass or metal rod, or, better, a point of wood or charcoal, a similar effect was produced ; an explosive formation of steam taking place, and the globule being driven away as if the point had exerted some repulsive force.

These phenomena may also be produced with other liquids treated under the same condition. Chloroform may be so heated when floating in a solution of cloride of zinc to a temperature of 90° or 100° Cent.

By means similar to the above, M. Dufour has equally succeeded in retarding the freezing of water. A mixture of chloroform and oil of sweet almonds is made, in which globules of water float in equilibrium. By cooling the mixture, the water scarcely ever freezes at 0° Cent. Its temperature sinks to —6°,—10° before congelation occurs, and globules have even been reduced to—20° Cent. without solidifying. Ultimately the globules either pass into solid grains of ice, or simply freeze on the surface, depending on the size and amount of reduction in temperature. The persistence with which the water retains the liquid state, is, however, remarkable. The mixture containing the globules may be shaken, and foreign bodies introduced, without solidification resulting. By touching the sphere, however, with a lump of ice, congelation is immediately effected. When one globule solidifies, the congelation of others still fluid may be effected by bringing them in contact with the frozen particle. Different effects are thus produced, depending on the temperature and the size of the spheres. Sometimes the spheres touching solidify suddenly, but remain separate ; sometimes they combine together, the one joining on or else enveloping the other at the moment of congelation. Irregular spheres formed of concentric layers and other varied shapes are thus produced. The author traces a resemblance between these frozen particles and the shape and structure of hailstones, which he conceives may be formed by a process somewhat analogous.

Other substances beside water present the foregoing phenomenon. Thus M. Dufour has experimented with sulphur, phosphorus and naphthaline. He finds that when melted sulphur is suspended in a solution of chloride of zinc having the same density as itself, the temperature may be reduced to 70° or 50° without solidification taking place. In this instance, the liquid condition possesses remarkable stability.—When the globules of sulphur remain fluid at 50° or 60° below the usual temperature of solidification, their chnage of state continues an interesting object. Globules half a millim. in diameter sometimes remain liquid at 5° Cent. for several days. Solidification is best provoked by contact with a piece of sulphur. Phosphorus in like manner may be reduced far below 44° Cent. without solidifying, and small globules may even be reduced to 5° or 6°. Many other substances would doubtless present the above phenomena. The principal obstacle lies in the difficulty of finding suitable menstrua.

FASTENING OF IRON BARS INTO STONE.

For this purpose lead is almost always employed, which forms a voltaic couple with the iron, by which that metal is rapidly rusted. Zinc, on the contrary, would preserve the iron.—*Dingler's Polytech. Journal.*

METHOD OF DISINFECTING MOLDY CASKS.

The casks are first washed out for about five minutes with an alkaline solution of soda, and then soaked for one or two days with a liquor acidulated with hydrochloric acid.

The committee of the Society for the Encouragement of National Industry report that the process is effective both for wine and beer casks ; that it is cheap, and saves great expense.—*Bull. Soc. Encour. l'Indust. Nat., May*, 1860.

The Atlantic Telegraph Again.

Strenuous efforts are now being made in London to to have another Atlantic Telegraph Cable laid, and two companies are already soliciting public favor with reference to it. One is the old Atlantic Telegraph Company, which, nothing daunted by its first tremendous loss and failure, is again endeavoring to restore public confidence, not only in the scientific practicability of the scheme, but in the commercial success that must follow upon its completion. C. W. Field, Esq., who has so long labored with indefatigable zeal in the promotion of this great cause, submitted his propositions to Earl Russell upon the subject, with a view of obtaining a joint guarantee from the American and English governments upon the entire capital required. The gist of the propositions made were to the effect that a capital of $3,500,000 would be required to carry out the scheme in an efficient and permanent manner ; that the English and American governments should jointly contribute one-third of the entire amount, leaving the remainder to be taken up in shares on both sides of the Atlantic, in the usual manner, the two governments having certain rights and privileges in return for their money.

The second competitor for the honor of accomplishing this great enterprise is the North Atlantic Telegraph Company, a company formed to effect telegraphic communication with America by such a route as would avoid the danger of a long stretch of sea way between Valentia and Newfoundland, and, above all, the difficulty of working through such an unbroken length of wire. To accomplish these important objects it was decided to lay the line in four distinct sections—the first from the north of England to the Faroe Islands, and the second from the Faroe Islands to the easternmost point of Iceland. Iceland itself is to be crossed by a short length of land line to Reikiavik, the capital. From Reikiavik the cable is again to be taken under the sea to Julianshaab, the capital of Greenland, and thence across the entrance to Davis's Strait to the southernmost point of Labrador. The advantages of this route are that its greatest stretch of submarine wire is only between 700 and 800 miles—not more, allowing for slack, than about one-third of the distance by the old deep sea line to Newfoundland ; while, on the other hand, the sections could be easily replaced or repaired, and it is in the highest degree improbable, almost impossible, in fact, that all four sections would get out of order at once, and so totally interrupt the communication. The British government were applied to about two years ago to allow a series of deep sea soundings to be taken along the proposed line, and they at once acquiesced, and Sir Leopold M'Clintock was dispatched to make the survey. The result of this showed that the greatest depth of water between the north of England and the Faroe Islands to Iceland did not exceed 600 fathoms, and was generally very much lower, averaging about 250 throughout. From Iceland to Greenland the water is much deeper, though not any where exceeding 1,500 fathoms ; while from Greenland to Labrador the greatest depth is 2,000 fathoms. The author of this scheme is Col. Tal. P. Shaffner, of Kentucky, who made the first survey of the route. We hope that both companies will be successful in obtaining funds to lay cables. It is only by practical experience that the best route for an Atlantic telegraph can be determined. We have no doubt but the telegraphic business between Europe and America would be more than sufficient to keep two lines busy.

A FIRM in Glasgow builds marine engines with double cylinders. The steam is admitted into the small one at a very high pressure ; it is cut off at half stroke and is then expanded into the large cylinder, the expansion amounting to eight times the original volume of steam. A saving of 50 per cent of fuel is said to be effected by them.

THE Great Western Railway Company of Canada has two locomotives provided with steel boilers and fireboxes.

Improved Coasting Sled.

The improvement in boys' sleds, here illustrated, is shown so clearly in the engraving that any description is scarcely needed. All who have in boyhood participated in the fun of sliding down hill will remember the exceedingly disagreeable feeling caused by the snow flying up the legs of the pantaloons whenever the heel was forced upon the surface to guide the sled; while in going "belly bump," or, as the boys in this city term it, "belly gutters," the toe of the boot was very quickly worn through in the operation of steering. The rising generation of boys, among the innumerable advantages which they enjoy over their predecessors, are not to be subjected to these annoyances. Every boy may now slide down the steep sides of the hills sitting comfortably in an upright position, legs and feet all aboard, and guiding his vehicle by rains, as if he were driving a mettled steed.

BROWN'S COASTING SLED.

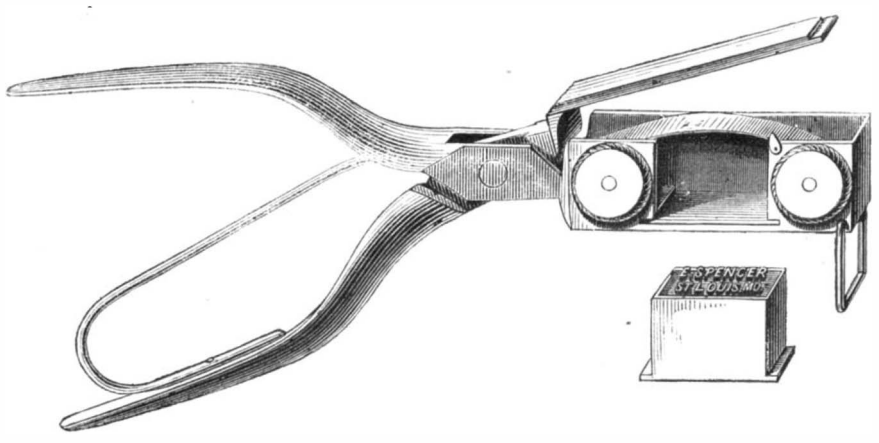
It will be seen by glancing at the engraving how this is accomplished by a new invention, which consists in attaching a guiding runner to the front part of the sled. A strip of board is fastened to the middle of the front part of the seat, and extends forward of the runners. To the lower side of this board the guiding runner is attached by a pivot pin, and a cross bar is secured rigidly to the runner at right angles. Upon this cross bar the feet of the rider are placed, and he can thus turn the runner in either direction, which guides the sled. A cord may also be attached to both ends of the cross bar to aid the operation, and support the rider in his seat.

The engraving illustrates clearly the various modes of using this steering device, as well as the danger of sliding the old kind, such as we used when a boy.

The patent for this invention was granted through the Scientific American Patent Agency, April 8, 1862, and further information in relation to it may be obtained by addressing the inventor, Isaac N. Brown, No. 2 Beekman street, New York City.

Conductor's Ticket Stamp.

Among the plans resorted to by railroad conductors to enable them to make sure of collecting their fares from all passengers, one device is to punch holes through a certain portion of the tickets when they are presented for the first time by the passenger; and many conductors carry little hand punches in their pockets for this purpose. Edward Spencer, of St. Louis, has invented a stamp to be used in place of a punch, so arranged that the conductor's name with the date, and the name of the station, may all be printed upon the ticket in place of the little hole made by a punch; thus affording a much more perfect check. This stamp is represented in the annexed engraving.



SPENCER'S HAND STAMP.

In the box upon one of the jaws an inking ribbon is wound upon one roller with the end attached to another roller, so that it may be wound from one roller to the other by simply turning the milled head. A box of type, shown below, is slipped into the jaw just below the ribbon, when by laying the end of the ticket between the jaws and pressing them together the letters of the type are printed on the ticket. The type are made moveable so that any words may be made which it is desired to print upon the ticket. A loop at the end of the jaws is provided for fastening them together when the stamp is to be placed in the pocket.

The ribbon is so prepared as to last a long time, is moved at pleasure by means of the brass button or collar, and conductors will be put to no unnecessary inconvenience or trouble in using the stamp. Its size is only one-third larger than the cut above, so that it is quite convenient to be carried.

To Railroad Companies desiring a correct record of their tickets, this stamp is specially recommended; and it will be found valuable for printing cards, dates, or stations on envelopes, bills, letters, &c. It is proposed to make a variety of sizes of the stamp, for General and Station Ticket Offices, and to that for conductor's use the usual punch can be applied at a small additional cost, whenever ordered.

For terms, &c., address E. Spencer, patentee, P. O. box, 1408, St. Louis, Mo.

A New Alloy.

An alloy, as a substitute for silver, is proposed by M. Trabuc, of Nismes; it consists of banca tin 375 parts, nickel 55, regulus of antimony 50, bismuth 20. One-third of the tin is placed at the bottom of a crucible of suitable dimensions, together with the nickel, antimony, and bismuth; upon this first layer a second third of the tin is deposited and covered with charcoal to the depth of 1½ inches; the crucible being covered up, it is heated to a white heat, then with the aid of an iron rod, also heated, we ascertain if the nickel be melted and the antimony be reduced, in that case the remaining portion of tin is passed through the charcoal, and the whole stirred until a perfect mixture of the different metals is obtained, it is then cast into ignots or other forms. The color of this alloy is silver white, and it resists the action of vinegar and other vegetable acids.

It is known that a saturated solution of salt in water boils at 228° Fah., while pure water boils at 212, but Rudberg says that the vapors of saline solutions under the ordinary pressure of the atmosphere, have only the temperature that they would possess if they were disengaged from pure water under the same pressure.

Glossing Linen.

Inquiry is frequently made respecting the mode of putting a gloss on linen collars and shirt bosoms like that on new linen.—This gloss, or enamel as it is sometimes called, is produced mainly by friction with a warm iron, and may be put on linen by almost any person. The linen to be glazed receives as much strong starch as it is possible to charge it with, then it is dried. To each pound of starch a piece of sperm, paraffine, or white wax, about the size of a walnut, is usually added. When ready to be ironed the linen is laid upon the table and moistened very slightly on the surface with a clean wet cloth. It is then ironed in the usual way with a flatiron, and is ready for the glossing operation. For this purpose a peculiar heavy flatiron, rounded at the bottom and polished as bright as a mirror, is used. It is pressed firmly upon the linen and rubbed with much force, and this frictional action puts on the gloss. "Elbow grease" is the principal secret connected with the art of glossing linen.

New Patent Law in England for Artists.

A bill has been introduced into the British Parliament to afford protection to the authors of original paintings, photographs and drawings. It provides that for a small sum original paintings, drawings and photographs may be registered, and protection from piracy given during the life of the patentee. It is stated in the bill, however, that when any painting or drawing, or the negative of any photograph, shall be for the first time sold or disposed of, the person so disposing of the same shall not retain the copyright, unless it be expressly reserved to him by agreement in writing. This bill is designed more particularly to protect artists from free trade in their productions through the agency of photography. Sir Hugh Cairns has moved in the House of Commons for a special committee to inquire into the patent laws. It is believed that these laws will be remodelled, and perhaps the American system will be adopted for Great Britain. It is advocated by one of our London cotemporaries.

About 6,000 bales of Surat cotton have been imported into the United States within the past six months.

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VOL. VI. NO. 19.....[NEW SERIES.].....*Eighteenth Year.*

NEW YORK, SATURDAY, MAY 10, 1862.

EXTENSION OF PATENTS—FOR WHOSE BENEFIT THEY ARE GRANTED.

There seems to be an impression among inventors that, since the law of March 4, 1861, went into force the previous law in respect to extending patents for seven years was abrogated. This is not so in regard to cases which were patented under the old law. Any patent which was granted prior to March 4, 1861, may be extended for seven years on proper application to the Patent Office, provided the patentee has not already been amply remunerated for his invention and proves to the satisfaction of the Commissioner that he has used proper diligence in attempting to realize gains from his patent. The patentees of 1848 and 1849 should lose no time in making out a statement of their profits and losses in consequence of their pattents, and in seeing counsel in regard to an extension, if they wish the term of these expiring patents continued for another seven years.

It is often the case that the extended term of a patent produces to the patentee a ten-fold profit over the amount realized during the first fourteen years of its existence. The assignees of a patent cannot obtain this extension; it must be done at the instance of the inventor, for whose sole benefit it is granted.

For full particulars concerning extension, address

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THE LAST PHASE OF THE ARMSTRONG GUN.

One of the most bewildering tasks that has ever fallen to our lot has been to keep track of the various modifications in the Armstrong gun. It commenced its career as a very complicated breech-loading rifled cannon, made on Prof. Treadwell's plan of hooping with wrought iron. After undergoing various modifications in its details, it next appeared with some mysterious peculiarity which caused it to be called a "Shunt gun." By the last arrival from England we learn it is now made with a *smooth bore to be loaded at the muzzle with spherical shot*, with no material peculiarity to distinguish it from any of that large class of cannon which are reinforced with hoops of wrought iron. In other words, Sir William Armstrong has laid aside his gun, and is making the old-fashioned kind of cannon.

This is an interesting fact in the history of gunnery, but the social and political facts connected with it are far more interesting. It is known that the English government has conferred the honor of knighthood upon Armstrong as a reward for his great invention, and more than $15,000,000 have been expended for the guns which have now been laid aside for the old-fashioned cannon. Notwithstanding this public abandonment of his invention, the pompous and pretentious English government, with its House of Noble Lords and its Honorable House of Commons, deliberately and intentionally swallows the imposition, and the great London *Times*, "the foremost paper of the world," "the Thunderer," gravely calls this smooth-bored muzzle-loader "the Armstrong gun!" Verily, it is an age of humbug.

THE deficit of the British revenue last year amounted to $5,500,000.

THE EXCITEMENT IN RELATION TO IRON-PLATED SHIPS.

To a person who has kept even moderately informed in regard to the experiments on iron plates, there is something amusing in the excitement caused by the fight between the *Merrimac* and *Monitor*. That action showed the power of certain kinds of plates to resist certain kinds of shot fired from certain kinds of guns with certain charges of powder, but did not show what would be the result, when any of these conditions were materially changed. The idea that it settled the whole question of the invulnerability of iron-plated ships is ridiculous, and the assumption that it showed harbor fortifications to be worthless is more ridiculous still.

In the first place neither the *Merrimac* nor the *Monitor* was furnished with the heaviest artillery which is manufactured at our arsenals, and which has been proved to be practically safe and serviceable. The *Monitor* had 11-inch guns firing shells weighing 169 lbs. and it is stated that the charge was 12 lbs. of powder. Now Rodman's 15-inch gun has been fired more than 500 times, with shells ranging from 315 to 330 lbs. in weight, and with charges of powder ranging from 35 to 50 lbs. giving initial velocities to the projectile varying from 902 to 1,328 feet per second. What the effect of such a missile would be upon iron plates cannot be even conjectured, plausibly, from the results of the firing on board the *Monitor*.

But this is not all. The 15-inch gun has not yet been half tested. It was so entirely uninjured by the 500 rounds, that experienced artillerists have no doubt that it will bear far higher charges. Capt. Rodman says in his official report:—

It is also certain that much higher velocities, and much greater ranges than any yet reached with this gun, may be safely attained, as I have the utmost confidence in its ability to endure 1,000 rounds with charges giving a maximum pressure of gas double as great as the greatest to which it has yet been subjected.

When the 15-inch gun has developed its full power, if it is not found sufficient to crush in the sides of iron-plated ships, then will come forth the 20-inch gun described on page 182 of our current volume, and its globe of cast iron, weighing half a tun, will be hurled out with a velocity almost the maximum that is ever attained by artillery, and far higher than is ever given to elongated projectiles.

This 1,000-pound shot is not the most destructive that can be thrown from the monster gun. From the porous character given to large masses of iron in cooling, Capt. Rodman thinks that a shell with a small cavity will be better, even for battering purposes, than a solid shot; so that our missiles having the greatest crushing effect are to be shells, with mines of powder in their midst. This shows more than anything else how perfectly untried is our heaviest ordinance in its effects upon iron plates. If it should prove that shells containing large charges of powder can be driven through the sides of armored ships, the powers of destruction will have a greater supremacy over those of defense than ever before. In that case an iron-plated ship can be sent to the bottom as quickly as any one of the wooden vessels which were destroyed at Sinope.

While the British people and Parliament were hastening to the conclusion that the battle in Hampton Roads had shown land fortifications to be worthless, experiments were in progress at Shoeburyness which were destined to upset this conclusion. Sir William Armstrong was sending 10½-inch spherical shot through targets like the side of the *Warrior* at every fire. But these experiments were not at all needed to prove the value of land fortifications. Many years ago, Gen. Totten, Chief of the Engineer Corps of the United States Army, made a series of experiments to determine what thickness of wrought iron plates would be required to render the face of fortifications invulnerable to projectiles from the heaviest ordnance in use. He decided that eight inches, with a backing of solid masonry, would be sufficient.

If the introduction of heavier ordnance should require a greater thickness of iron plates, it is manifest that this could be placed on earthen foundations more easily than upon structures floating upon water. The size of a floating structure must increase with the thickness of the iron which it supports, but the size is limited by the strength of the material of which the structure is formed; while there is no limit to the thickness of an iron wall which may be built upon a marble or granite ledge.

Nothing has been better settled for several years, among both naval and military engineers, than the worthlessness of wooden ships of war. The fight in Hampton Roads has impressed this truth upon the public, but it has made no more important contribution to the art of naval attack and defense than either one of a considerable number of experiments, and it most certainly has not shown the worthlessness of land fortifications.

SECRETS OF THE BESSEMER PROCESS.

The Bessemer process—so called—consists in blowing air for a very short period through molten pig iron, for the purpose of removing the excess of carbon, by bringing oxygen into contact with it, and producing carbonic acid gas. The process is based upon scientific principles, as it is generally considered that steel contains a somewhat less quantity of carbon than cast iron, and wrought iron is just decarbonized pig metal. The process of Bessemer has been illustrated in former volumes of the SCIENTIFIC AMERICAN, and we need not now repeat further particulars connected with it; our present object is quite different. It is known to us and many others, that Dr. Martien, of Newark, N. J., obtained a patent in England for treating pig iron by the pneumatic process, before Bessemer made an experiment; and Mr. Kelly, another American inventor, antedates him by a considerable period of time. Now it was stated credibly that Bessemer failed to produce uniformly good iron by his method for several years after he commenced operations, but he steadily pursued his object, and at last has attained to such perfection and success that his method is coming into very general use in England. He certainly deserves great credit for his perseverance. On the other hand, what can we say of our more early inventors of the pneumatic process? So far as we know, there is not a single pound of steel or malleable iron made in any establishment in our country by it. Can any reason be given for this? A correspondent of the London *Engineer* lets out the secret. He asserts that the iron produced by the pneumatic process is valueless, and says: "It is now pretty generally known, though the fact has been carefully suppressed by Mr. Bessemer in all his papers, so ostentatiously read before various scientific bodies, that the success of the pneumatic process is solely due to the addition of a metallic compound, consisting essentially of iron and manganese, and containing also carbon and a little silicon to cast iron, after the cast iron has been decarbonized by the pneumatic process." We attach no blame to Mr. Bessemer for keeping this process as secret as possible, but if the statement of the correspondent referred to is correct, his information is a precious boon to American iron manufacturers. We have an abundance of the finest manganese iron ore in the world in our Franklinite for carrying on the Bessemer process, as thus improved.

THE BRITISH IRON-CLAD NAVY.

It is not publicly known how many iron-clad vessels the French have completed, but it is supposed to be no less than from twelve to twenty of the first-class frigates. Louis Napoleon has been quietly preparing an iron-clad fleet for several years. It is the same with England. The late hubbub in the Parliament, and the long discussions in the British papers respecting iron-clad ships and land batteries, have called out much talk from persons who know nothing about what had been done or what was quietly being done by the naval authorities of that country to complete an iron-clad fleet. It is the policy of such governments not to make public all their new military or naval preparations. The British have four iron-clad frigates completed, namely, the *Warrior*, *Black Prince*, *Resistance* and *Defense*. The two former are the largest steam frigates ever built. In addition to these four frigates the following iron-clad frigates are also in the course of construction: the *Achilles*, 50 guns, 6,079 tuns; *Agincourt*, 50 guns, 6,621 tuns; *Northumberland*, 50 guns, 6,621 tuns; *Minotaur*, 50 guns, 6,621 tuns; *Valient*, 32 guns, 4,063 tuns; *Orontes*, 13 guns, 2,812 tuns; *Hector*, 32 guns, 4,063 tuns. These seven vessels will not be completed perhaps before the end of next year, but the following are designed to be finished within 1862: *Caledonia*, 50 guns, 4,045 tuns; *Ocean*, 50 guns, 4,045 tuns; *Prince Consort*, 50 guns,

4,045 tuns; *Royal Oak*, 40 guns, 3,716 tuns; *Royal Alfred*, 40 guns, 3,716 tuns. In addition to these three large three-deckers are to be cut down and constructed with revolving turrets. At the end of this year they will, therefore, have twelve iron-clad vessels completed, forming a very powerful fleet.

PIEDMONT GOLD MINING AND AMALGAMATING SYSTEM.

No metal is more universally distributed than gold, and yet there are but few places where gold mining is carried on profitably. This is owing to the precious metal being distributed in such limited quantities in most sands and rocks, also the imperfection of the processes most commonly employed for its extraction. An accurate valuation of gold veins cannot be ascertained from analysis of selected fragments of ore, but by the treatment of such a large quantity as will conclusively determine its general richness. Gold has lately been discovered throughout a considerable extent of Nova Scotia, and also in several places in Vermont, but we know not whether it occurs in such quantities as will pay the expenses incured in the operations usually employed for extracting it from its ores in these regions. In some countries gold ores, containing what may be considered a very small amount of the precious metal, are operated with profit, owing to the economical processes employed in treating them, while in other places the mining of richer ores has proved ruinous to many parties, because of the expensive modes adopted for treating them. In all cases the cheapest processes should be employed, but the question naturally arises here, "What are really the most economical processes of gold operations?" Mr. Joseph Alcide Bertola, No. 29 St. Mark's Place, this city, having had his attention drawn to the inquiries made in our columns respecting Nova Scotia ores has called upon and given us some information respecting gold mining in Piedmont, Italy, where such operations have been carried on from time immemorial with very *lean* ores.

The auriferous sands in that country, he states, are exceedingly poor, but there are several tribes of gypsies who engage frequently in gold washing, and each person gathers from 50 to 140 cents worth of gold daily by a very simple apparatus. This consists of a board five feet long and two feet wide, with cross grooves half an inch in depth cut into it at short distances apart. A trough with a grating upon it is also secured to the upper part to separate the very coarse from the fine sands. This board is placed in an inclined position and the sands (which are frequently gravelly) are shoveled into the trough, and a thin stream of water made to flow equally through it. The water carries off the lighter particles, while the gold, being much heavier than the sands, remains behind in the grooves. These are cleaned out occasionally, and the contents set aside for a second operation. This consists in placing them in a wooden bowl about 2½ feet wide, shaped like a watch glass (quite shallow), and having a small cavity, formed like a lady's sewing thimble, in the center of the bottom. The second and final operation is always performed towards the close of the day by the gold washer. The bowl is filled with water, then about three pounds of the concentrated washings taken from the grooves of the board are put into it and stirred well with the hand. While this is being done the bowl is also moved from side to side, and made to revolve rapidly when the lighter particles, consisting of black sands, are made to flow over, and the gold is whirled into the center and caught in the thimble pocket. The proper movements of the bowl are only acquired by considerable practice.

As gold has been found in greater or less quantities in all the coast range of mountains stretching from beyond Quebec down into North Carolina, probably the sands in the streams which flow from these mountains may be much richer in the precious metals than the sands which are washed by the gypsies in Piedmont, and the same mode of gold washing may perhaps be profitably conducted, in many places where no gold is now supposed to exist.

Quartz mining is carried on in Piedmont on the mountains. Tunnels are cut into the rocks and are so inclined as to carry off the water. The rock is a hard porphyroid gneiss. Whenever a mine reaches such a depth that it cannot carry off the water from it a new tunnel is sunk at a lower level. In many places the entrances of these tunnels may be seen at different hights on the mountain-side like the windows in the different stories in a house. The ore taken out from a mine is first broken into small pieces with hammers to free it from as much gangue as possible, then it is carried in baskets through rough, narrow paths to the mill house, by the girls of the country, who are very strong and industrious. The ore receives its first grinding between burr stones made of porphyroid gneiss. In the very smallest establishments, one grinding mill and four amalgamating mills are used. In some establishments there are no less than 80 mills employed. Each is operated by a small horizontal water wheel of the most simple construction. The miners make and repair them, as well as most of the machinery. These amalgamating mills are very plain. They consist of two thick circular gneiss stones; each about 2½ feet in diameter, the lower one being stationary, the upper one the runner, and the whole inclosed in a wooden vat which contains about five pails full of water. The ground ore is introduced into the amalgamating mills in small quantities of about from 10 to 15 lbs., and it here undergoes a second grinding in contact with the mercury. The ore and water are thoroughly stirred by the running stones, and the mill is charged every hour without stopping the stones, by pulling out the plug of the vat, and permiting the slush water to run off, leaving the amalgam behind. A new charge is then put in, clean water added and the operations thus continued until the mercury is saturated with gold. Each amalgamating mill is charged with only eight ounces of mercury, and the amalgam obtained with the gold, is taken out but once a week, excepting when the ore is very rich. It is removed with a long iron spoon, and the gold is separated from the quicksilver by squeezing the amalgam in a soft leather bag—the gold remains behind, and the mercury passes through the pores of the bag. All the mercury may be driven off from an amalgam of gold by submitting it to heat in a suitable retort.

A very small capital is required to start a Piedmontese gold mill, the machinery being so simple and inexpensive. The great object of all gold mining operations, as stated before, should be to extract the precious metal at the smallest possible cost. The Piedmontese system, improved by Mr. Bertola, has been introduced, he informs us, in a few cases, in California, with gratifying success.

RECENT FOREIGN INVENTIONS AND DISCOVERIES.

Odontalgic Elixer.—M. A. F. Mennons, of Paris, has taken out a patent for the following medicinal extract, to be applied in the treatment of *caries* and other diseases of the teeth. Take about 10 quarts of alcoholic spirit, add thereto 2¼ lbs. of cochlearia; 13½ oz. of tulfoil; cochineal, 2 oz., and 1 oz. each pulverized cloves and cinnamon. The mass is left to infuse for 15 days, then it is filtered and to it is added 10 oz. of the tincture of quinquinia; concentrated essence of aniseed, 1⅞ oz.; essence of mint ⅔ oz.

Shirt Collars, Fronts, &c., of Enameled Cloth.—A patent has been taken out by A. Granger, of London, for making the above-named articles of a material which he states is known in England by the name of "American leather cloth." This is our white enameled cloth which is prepared with white paint and white varnishes. White enameled cloth resembling sheep skin is also made by saturating cotton cloth with French white and a strong solution of glue and starch, then submitting it to the glazing operation by running it between polished iron rollers.

Horn Pens.—Pens have been and are made of reeds, quills, steel, brass, copper, hard india rubber, glass and gold, and to these M. Evans and E. Concannon, of London, have added pens made of horn. The horn is first heated, then rolled out under pressure into sheets, after which it is cut out by a stamping machine into the blanks of pens of any suitable size. These blanks are then softened by steam, placed in dies, the slits made in them, and the proper shape given.

New Gunpowder.—E. Harrison and T. S. Yates, of Oldham, England, have applied for a patent for the following composition:—Chlorate of potash, 56 parts, (by weight); prussiate of potash, 28 parts; starch, 4; sulphur, 7; charcoal, 5. This makes a very good powder, it is stated, for general purposes.

Pickers of Shuttles.—J. B. Wood, of Broughton, near Manchester, England, has obtained a patent for making a shuttle picker of one solid piece of a compound of buffalo or other rawhide, instead of folding a piece of pure hide upon itself, and securing it by a wire in the usual way. The untanned hide for making the new solid picker is macerated in water of about 80° Fah. in temperature for one or two days, when it becomes soft for further operation. It is now lifted and exposed to the atmosphere for about 24 hours, then cut into strips, and passed first through fluted iron rolls, then between a pair of smooth rolls, until it is converted into a uniform pulpy mass, which is kept at a temperature of 90° Fah. for two days, during which time it is frequently turned over. This soft mass is now mixed with about 10 per cent of flax, or like fiber, then pressed between heavy iron rollers for the purpose of mixing the two substances. This pressure converts it into flat cakes of the thickness required, and when it becomes dry the pickers are stamped out of it with a machine, then it is placed in a mold and subjected to hydraulic pressure. After this it is removed and placed upon a shelf until it is completely dried. Pickers thus made are stated to be of a very superior character.

Soapstone-Powder Lubricator.—Soapstone, or steatite, is used for making a great number of articles, such as griddles for cooking pancakes, bricks for lining furnaces, smoking pipes, &c., and John Bethell, of London, has taken out a patent for using it in the form of dust as a lubricant for the axles of machines. For this purpose it is prepared as follows:—It is first reduced to the condition of very fine powder, then it is washed to remove all gritty particles, then it is steeped for a short period in dilute muriatic acid (about one quart of acid to twenty of water) in which it is stirred until all particles of iron which it contains are dissolved. The powder is then washed in pure water again to remove all traces of acid, then it is dried and is the purified steatite powder used for lubrication. It is not used alone, but is mixed with oils and fats, in the proportion of about 35 per cent of the powder added to paraffine, rape or other oil. This steatite powder mixed with any of the soapy compounds which are also now used in many cases for lubrication, also answers a good purpose. It is chiefly intended for heavy machinery, such as the journals of water wheels, railway and other carriages.

Naphthaline Purple Dye.—W. L. Scott, of Bayswater, England, has obtained a patent for a product of binitro-naphthaline as the basis for red and other dyes. He takes ten parts of sulphuric acid (specific gravity 1·650) and heats it to 360° Fah., and adds to this from two to four parts of binitro-naphthaline, and a small quantity of sulpho-naphthalic acid. When the mixture is completed small strips of zinc are added for the purpose of deoxidizing it, and when it is fully deoxidized the color becomes deep red. It is now allowed to cool, some dilute alkali, such as soda, added partly to neutralize the free acid, and the whole is then boiled for a short period of time under pressure. The liquor is now filtered, and the clear coloring matter separated from the precipitate. By treating the precipitate with benzole, or an alkali, all the red matter is extracted. It is called *dianthine*. When this product is treated with nitric acid so as to form the nitrate of dianthine, and this again treated with ammonia and alcohol, it makes a beautiful red dye of a scarlet tint.

W. Bennet, of Paddington, England, has taken out a patent for fire kindlers made of little blocks of dried peat dipt into melted resin and then dried.

A Railroad "Sink."—The Lafayette, Ind., *Journal* says a portion of the track of the Pittsburgh, Fort Wayne and Chicago Railroad has sunk out of sight three times. The space where this occurred is about two hundred feet long. After losing two other tracks, the company inserted piles. These have also sunk out of sight. They are now driving down piles of over sixty feet in length, and yet have not found hard ground. This spot is supposed to have been once occupied by a lake, over which vegetation has spread a thin crust.

At the Brooklyn Navy Yard are a number of large bronze cannon captured in Mexico. They have the date of their manufacture upon them, and are all more than 100 years old.

THE GREAT EXHIBITION.

[Our Special Correspondence.]

London, April 7, 1862.

Messrs. Editors :—I wish to lay before the readers of the Scientific American, and all who are directly interested in the Great International Exhibition now being organized in this, the largest city on our globe, some facts relating to our position as American exhibitors. It is hardly necessary to repeat the singular action of our government in relation to it. The distracted condition of our political affairs, and the onerous duties devolving upon the President and his Cabinet may be fairly urged as an excuse for the delay in appointing a commissioner to take charge of the interests and articles of American exhibitors. But, although an excuse may be offered for the delay, I cannot offer an excuse for the official action of our government. I have a right to speak plainly on this subject, for I am acquainted with the facts of the case, and I am more directly interested than any other person in the success or failure of the "American Division" of this exhibition.

The President was urgently solicited by inventors and manufacturers to appoint a single commissioner, to whom the whole organization of the American department and the interests of American contributors should be entrusted, and he was solicited to rise above party and political considerations, and allow the industrial interests of our country a trusted and experienced leader. Col. Johnson, of the New York State Agricultural Society, was presented as the choice of thousands ; or, in case he should not receive the appointment, John H. Klippart, of the Ohio State Board of Agriculture, was suggested. I understand that the President favored such a choice for some time, and was on the eve of making the appointment, but as some political cliques anticipated a liberal appropriation of money for the commission, they exerted an influence which has been injurious in its results. Twelve commissioners were appointed, three of whom were men of experience, and were willing to devote their energies to the performance of their duties, but the others were more injurious than beneficial, and at last, to cap the climax, a most unfelicitous proclamation was issued by the Secretary of State, after the articles of our exhibitors had been shipped for the exhibition. This proclamation was issued not because Congress had failed to make a suitable appropriation for the payment of expenses connected with any commission respecting the exhibition, but because the contributions were of the plain, utilitarian class, and not sufficiently showy objects. This was a mistaken policy, for utility, not show, will be the standard by which American machines will be judged here.

Our Minister in London and the American Consul tried in vain to get our articles admitted after that proclamation was received here. But at last, through old friendship for Col. Johnson and myself, the doors of the Exhibition have been opened to us. I held the commission to act as agent for American exhibitors until a regular commissioner should arrive, and I had no official notice rescinding my temporary appointment. Mr. Seward's awkward proclamation so nearly upset all my efforts that I had almost begun to despair of gaining access to the Exhibition. But, at last, we have been received, and Col. Johnson will yet be here as our leader, and the Royal Commissioners have given us all the space they possibly can, without turning out some exhibitors who now occupy positions previously intended for Americans, but which were considered as abandoned by our government. We are most cordially greeted by every official connected with this enterprise, and can bide our time. Whatever may have been the general expression of feeling here during the excitement of the *Trent* affair, I have now to report a very favorable and reasonable consideration of American affairs—in fact I have not met a secession sympathiser since my arrival in England, and I am confident that if our government pursues a vigorous policy with the secessionists there will be no more talk of English interference.

I have a great deal of labor to perform—attending to correspondents and exhibitors, and, for want of funds, Mr. Taylor and myself are doing all the work of unboxing and setting in order the articles of about fifty contributors. I feel sure there will be no such quarreling as there was under the Riddle administration, in 1851, over $25,000 government funds. Had I the dictation of the whole exhibition, I could not have hoped for more attention and kindness from the Royal Commissioners.

For six months I have done the heaviest labors of the American part of the enterprise, without the remuneration of a postage stamp or sheet of paper from our government. I am positive that had I ceased my efforts there would have been no American display here, and I feel confident that if I am not interfered with through the Department at Washington we shall come out of the contest with much credit to American exhibitors.

Respecting the building for the exhibition, there is much difference of opinion. As a whole, I think it is admirably adapted for the purposes it was designed, though it is not "a thing of beauty." I look forward to a great success for American contributors. I am sure that those of our citizens who visit the Exhibition will find nothing to be ashamed of. A few generous friends are contributing something for the decorations of our department. Exhibitors, as a whole, have come very far short in supplying the funds necessary for the proper care of their goods ; some of them, however, have done their whole duty, and have shown a noble spirit. Every civilized government on the globe but the United States has contributed very liberally to the objects of this Exhibition. Our manufacturers and artists had very nearly lost an opportunity of being known here as being within the pale of civilization and art, and as having a nationality. As soon as the articles are arranged so that I may be able to classify them, I will endeavor to give a condensed history and description of those which are of most importance to the readers of the Scientific American.

Joseph E. Holmes.

Cultivation and Use of Willows.

The following are extracts from an essay on the above subject in the Transactions of Highland and Agricultural Society of Scotland :—

Willow makes the very best kind of charcoal, and is highly esteemed in the making of gunpowder. The bark is used for tanning several kinds of leather. So from this we may learn that the consumption of willows, if more extensively grown, might be greater ; and plantations, or large beds of osiers, might be very advantageously grown in almost any soil, such as banks of rivers, &c., and annually cut, would produce a sum of money that I have no doubt would largely remunerate the grower. And from land that can not otherwise be made available for tillage, notwithstanding the vicissitudes of seasons taking good and bad under view, the writer has experimentally ascertained that an acre of willows or osiers will often bring the grower a larger gum of money than an acre of wheat ; and likewise from land that would be almost useless for other crops.

As regards the nature of soil and subsoil suitable for growing them to the best perfection, osiers delight in banks of rivers or drained swamps, and are greatly invigorated by occasional flood of irrigations. Plantations of them may also be formed, and will succeed well on low spongy bottoms along the margins of streams.

In the great majority of farms will be found level, marshy, wet spots, which, by drainage, cannot well be made available for tillage, which might be planted with the willow, and would afterward recompense the proprietor or farmer in a two-fold way. The land might be prepared in various ways for this crop, owing to the extent and nature of the soil. For plantations of any considerable extent for osiers, the ground should be formed by the spade, into beds of from eight to nine feet broad, with intervening furrows or narrow ditches to carry off the water. The planta tion may by made at any time between the fall of the leaf and an advanced period in spring, but the last two weeks of February, and the first weeks of March, in England, April and the Middle of May in America, are the most proper times for planting the willows. Cuttings fifteen inches long should be taken with a knife on an upward slope from well-ripened wood of either two or three years' growth ; they grow more luxuriantly when planted about two-thirds of their length in the ground, than when they are less deeply planted.

Osiers succeed best in a deep, moist free soil—ground dug to the depth of 24 inches, with a small quantity of dung and old lime rubbish put in the bottom of the trench.

The willow, for the use of the basketmaker, should be cut every year slopingly with the knife, within three buds of the point whence the shoot issued, and will admit of being cut back once in three years for the use of the cooper, exactly to the swell of the shoot of the three years' growth—thus compressing the plant back to its ancient dwarf form, at the same time realizing a handsome return.

Moreover, by treating osiers in this way, they will last and produce well for a great many years. The ground should be deeply stirred with the hoe, and kept clear of weeds ; but digging with a spade around the roots of willows often proves very hurtful to the fibrous feeders, as we often meet with a great portion of such oozing and growing very near the surface of the soil.

The way in which willows are most commonly disposed of after being cut is, they are sorted into trusses and tied into bundles of two and sometimes three feet in circumference ; and if intended to be stripped of their bark, they are set on the thick end, and immersed a few inches in standing water.

They succeed best in Northern exposures, provided they are not overtopped. Should the ground be at all suitable for the crop, each set will produce the first year two good basket rods, or 24,000. The second year, the sets, being much stronger, will produce on an average six rods, one more or less being considered a very common number—one of which may be left on each stock for hoops, and the remaining 60,000 cut for baskets, which would be worth about $120.

A "Monitor" for the Lakes.

The memorial of the Chamber of Commerce of this city in relation to lake defences has been laid before the legislature, accompanied by a letter from Captain Ericsson.

Messrs. Ruggles, Griffith, Nye, Trask and Duer, the committee appointed by the Chamber of Commerce to memorialize the legislature, urge the necessity of measures for the defence of the commerce of the lakes, and recommend the enlargement of one tier of the locks of the Erie and Chenango canals to a size sufficient to permit the passage of mail-clad vessels.

In order to show that vessels like the *Monitor* can pass through locks twenty-five feet broad and two hundred feet long, the committee give the following letter from Captain Ericsson :—

New York, April 14, 1862.

Sir:—After a full consideration of the subject of your inquiry, I have to state that an impregnable iron vessel, two hundred feet long and twenty-five feet wide, constructed on the general plan of the *Monitor*, will have sufficient buoyancy to carry a shot-proof iron turret carrying a gun of fifteen-inch caliber, with a ball of four hundred and fifty pounds, and capable of destroying any hostile vessel that could be put on the lakes. Without coal, ammunition and stores, such a vessel will draw six feet six inches, and measure eighteen feet in hight from bottom of keel to top of turret. Before going into action a certain quantity of ballast, in addition to coal, ammunition and stores, will be put on board, in order to attain what may be termed the fighting draft of eight feet.

Yours, very respectfully,

J. Ericsson.

P. S.—The cost of a war vessel, as above suggested, will not exceed $200,000. J. E.

Cotton Coming Forward.

The Nashville *Union* says there is great briskness in the cotton market at present at that point. Loads are constantly passing through the city on their way to the river. One boat, a few days since, left with some 200 bales. Buyers are scouring the country in all directions as far as the protection of the Federal lines extend, and sometimes even further. The planters are acting like men of practical sense, and are quick to trade. Good middling readily brings sixteen and seventeen cents in specie or United States Treasury notes, and twenty and twenty-five in current Tennessee paper. There is no holding back on the part of the planters. They all fully appreciate the immense benefits which reviving trade will scatter over an almost bankrupt country. One thing has forced itself upon the minds of those even who were unwilling at first to admit the fact—interference with private property which has not been involved in the rebellion will not be made by Federal troops. All parties now feel secure in this respect.

The chloride of gold produces a beautiful lilac color on silk.

RECENT AMERICAN INVENTIONS.

Apparatus for Evaporating—The object of this invention is to arrange a furnace and an evaporating pan in such relation to each other that the expressed stalks from the sugar cane may be used as fuel, and thereby an economical and very effective apparatus for evaporating saccharine liquids be produced. The invention consists in the arrangement of a pit dug in the ground or built up of brick, and provided with suitable air-holes and a damper, and also with a conical arched spout to receive the stalks and refuse of sugar cane, in combination with an evaporating pan furnished with a series of heating tubes in such a manner that the heat derived from burning the expressed stalks and refuse of sugar cane in said pit may be passed through the heating tubes in the pan, or that the communication between the pan and the pit may be shut off at pleasure. It consists further in the arrangement of a reciprocating scraper acting on the exterior surface of the heating tubes and on the bottom of the pan, in such a manner that the juice is prevented sticking to the heating surface where it would be burned, and so impart a disagreeable flavor and color to the sirup. The patentee is Wm. Thomson, of Detroit, Mich.

Revolving Ordnance and Firearms.—This invention consists in a novel mode or securing the many-chambered cylinder of a revolving cannon or small-arm in place, whereby its easy removal and replacement, when under any circumstances desirable, is provided for. The principal objects of the invention are, first, to provide, by the use of two or more cylinders that may be quickly changed at pleasure, for the rapid repetition of the discharge of revolving ordnance or small arms without overheating the chambers; second, to provide for the loading of a piece of ordnance, arranged on the deck of a ship or other vessel or in *barbette*, by men below the deck or waterline, or below the embrasure through which the gun is fired. James A. Whalen, of Brooklyn, N. Y., is the inventor.

Firearms.—W. W. Gould, of Skowhegan, Maine, is the patentee of an improvement in firearms. The object of his invention is to obtain a more perfect combustion of the charge of gunpowder in ordnance and firearms than is effected by the ordinary construction of the vent and thereby to obtain a more forcible discharge of the projectile and greater length of range and depth of penetration; and to this end it consists in the construction or the vent to convey the fire from one point on the outside of the gun to two or more points in the charge.

New Publications.

THE CHANNINGS; A Domestic Novel of Real Life. By Mrs. Henry Wood, Author of "The Earl's Heirs," "East Lynne, or the Earl's Daughter," "The Castle's Heirs," "The Mystery," "A Life Secret," &c. Published by T. B. Peterson & Bros., Philadelphia. F. A. Brady, Agent, New York. Price 50 cents.

AUTO-PHOTOGRAPH ALBUM. Messrs. Samuel Bowles & Co., Publishers, Springfield, Mass.

We have received from the above firm something new in the way of albums. They style it the auto-photograph album, it being designed to contain the picture of the friend or public character whose likeness you may wish to preserve; but there is also a nice arrangement for the autograph, which may be inserted underneath the picture. The album now before us has a compact and steady feeling, which assures us that it is well made, and will bear all the handling which curiosity may require of it. If any one wishes to purchase an album they had better send to this firm for one of their neat little manual of prices.

THE BIBLEOTHECA SACRA. Published by Warren F. Draper, Andover, Mass.

The volume of this profound theological review for the present quarter contains essays on the "Doctrines of Methodism," English Etymology," "Divine Decrees," &c.

TO OUR READERS.

Models are required to accompany applications for Patents under the new law, the same as formerly, except on Design Patents, when two good drawings are all that is required to accompany the petition, specification and oath, except the government fee.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona fide* acknowledgment of our reception of their funds.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

NEW PAMPHLETS IN GERMAN.—We have just issued a revised edition of our pamphlet of *Instructions to Inventors*, containing a digest of the fees required under the new Patent Law, &c., printed in the German language, which persons can have gratis upon application at this office. Address MUNN & CO.,
No. 37 Park-row, New York.

ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING APRIL 22, 1862.

Reported Officially for the Scientific American.

*** Pamphlets giving full particulars of the mode of applying for patents, under the new law which went into force March 2, 1861, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

35,008.—O. W. Bayley, of Somerville, Mass., for Improvement in Breech-Loading Firearms:

I claim the combination of the breech piece, D, with the cylinder, E, which is moved forward after the breech piece is in place, to tighten the joint at the rear end of the barrel, substantially in the manner described.

35,009.—J. B. Bowen and J. E. Baker, of Madison, Wis., for Improvement in Harvesters:

We claim the combination of the two projecting arms, E E, of the rake head, the rake carrier, G, and vertical pivot, H, stationary on the frame of the machine, the rake hinging around the rake carrier, and the rake carrier hinged around the pivot, when the rake carrier is so constructed and situated as not to extend over the platform, substantially as and for the purpose specified.

We also claim the combination of the arm, R, which bears the stop, Q, with the lever, S, and rod, l, arranged substantially as and for the purpose specified.

35,010.—C. P. Brockett, of New Haven, Conn., for Improved Lamp Burner:

I claim, first, The plate, F, with cone, G, attached, pivoted to the plate, E, at the top of the burner, provided with a catch, H, and arranged relatively with the wick tube, B, to admit of the plate, F, with chimney attached, being shoved off from and on the burner for the purpose specified.

Second, The tube stopper, h, attached to the under side of the plate, F, in combination with the cross bar, i, secured to the plate, E, and in such relation with plate, F, and cone, G, as to elevate plate, F, and stopper, h, and admit of said stopper being raised out of and fitted in tube, C, by the movement of plate, F, as set forth.

Third, The tube, C, fitted in the burner, A, in connection with the movable plate, F, arranged substantially as shown, to cover the tube when the burner is in use and the lamp lighted, and to expose the tube for filling the lamp when the plate, F, is shoved off from the burner.

[This invention relates to an improved lamp burner of that class which is designed for burning coal oil and other hydrocarbons, and in which a glass chimney is employed for producing a requisite draught to support proper combustion for illuminating purposes. The object of the invention is to obtain a burner which will admit of the lamp being supplied with oil without detaching it from the lamp, and which will also admit of the chimney being so adjusted as to render the wick tube accessible for the purpose of trimming the wick and placing the same in the tube without detaching the chimney from the burner.]

35,011.—William Burgyes, of Chelsea, Mass., for Improvement in Sweat Bands for Hats:

I claim the described arrangement and combination of the inelastic and flexible band, e, with the head lining, b, and the air space, d, arranged between the hat body and head lining, and for the purpose as set forth.

35,012.—Hiram Clark, of Rochester, N. Y., for an Improvement in Skates:

I claim the employment in skates of bent (by steaming or boiling) wooden foot pieces, for the purposes set forth.

35,013.—W. R. Cunningham, of Brooklyn, Ohio, for Improvement in Water Elevators:

I claim the self-regulating brake, composed of the spring, 8 8 8, the sliding journal box, 7, the rubber, 11, used in connection with the friction flange, 10, the whole being constructed substanually in the manner and for the purpose specified.

35,014.—G. W. Dechant, of Berrysburg, Pa., for Improved Rotating Meat Chopper:

I claim moving the block, A, intermittently by means of the cogs, j, on the block, A, and the radial cogs, I'', on the face of the cog wheel, I, in combination with the cutters, C K, when these parts are arranged and operated as set forth.

35,015.—F. W. Dexter, of Randolph, N. Y., for Improvement in Box Setters for Wheel Hubs:

I claim a clamp for holding the hub for boring, consisting of the head piece, A, cone piece, B, screw rods, C, and nuts, D, substantially as described.

35,016.—William Ellmaker and C. Hurst, of Earl Township, Pa., for Improvement in Carriage Brake:

We claim the arrangement of the jointed lever, A B, the step staple, a b, and the jointed rod, F, combined and operated substantially as set forth for the purpose specified.

35,017.—J. O'Farrell, of New York City, for Improvement in Wheel Vehicles:

I claim the connecting of front axle, F, to the perch or reach, B, by means of the two slides, E, G, placed respectively on the shafts, D H, and connected with the axle, F, substantially as shown, for the purpose set forth.

[This invention relates to an improvement in the manner of attaching the front able of the vehicle to the perch, or the fixtures connected to the body, as fully shown and described, whereby the vehicle may be turned within a small compass, the front wheels admitting of being so cramped or turned as to ensure the result stated, and still allow a requisite space between the front and back wheels for the attachment of proper steps to the body of the vehicle, and also admit of the front and back wheels being placed nearer together than usual without coming in contact when the front wheels are turned or cramped.]

35,018.—Howard Gill, of Dedham, Mass., for Improved Folding Bedstead:

I claim the bedstead, A, formed of two parts, B C, connected by hinges, and provided respectively with an adjustable headboard, e, and a fixed footboard, h, in connection with the folding or hinged leaves, i j, attached to the bottom, d, of the part, C, of the bedstead, as and for the purpose set forth.

I further claim the combination of the folding bedstead, A, leaves, i j, and trundle bed, D, arranged as set forth.

[This invention consists in constructing a bedstead, table and trundle bed, in such a manner that the device may be used in any of the above-named capacities, and still be capable of being compactly folded when not in use, and forming, while in use or otherwise, an ornamental piece of furniture.]

35,019.—W. W. Gould, of Skowhegan, Maine, for Improvement in the Vent Holes of Ordnance:

I claim the combination of the two obliquely arranged flanged tubes, B B', having their flanges beveled as shown at e, and the covering plate, D, having an aperture, i, the whole arranged and operating substantially as and for the purpose set forth.

35,020.—Jeremiah Hall, of Granville, Ohio, for Improvement in Reäction Car Brakes:

I claim, first, The combination with a railroad car axle of the sleeve, E, the ratchet wheels, D D', and the drum wheels, F F', and pawls, I I', substantially as described.

Second, The combination of the springs, R, with the drum wheels, F F', the pulleys, W W', and chains, H H' H'', substantially as described.

Third, The combination of the treadle or foot lever, M M, levers, X X', and their connecting chain and rod, in combination with the stop, S S', and for the purpose, as substantially described.

Fourth, The combination of the reaction car brake, as claimed, with the friction car brake, P, and chain, O, as described.

35,021.—N. D. Hartley and M. S. Morehouse, of Quincy, Ill., for Improvement in Coffee Pots:

We claim, as an improved article of manufacture, a coffee pot provided with pipes, J H, chamber, G, vessel, D, strainer, E, and box, F, and otherwise made as shown and described.

[The object of this invention is to prevent the escape of the steam and aroma during the process of making the coffee, and by a very simple arrangement of means, which also ensures a perfect separation of the liquid from the grounds, or, in other words, ensures the coffee being made or produced clear, and in a very short period. An engraving of this coffee pot will appear in our columns soon.]

35,022.—J. H. Hascall, of Corunna, Mich., for Improved Medicine for Miasmatic Diseases:

I claim the composition made of the material, substantially as described and for the purpose set forth.

35,023.—A. C. Hoag, of Clinton, Ill., for Improved Broom:

I claim the method of fastening brooms to the handles thereof, by means of the plates, C and D, connected by the rivets, b c, and the screw bolts, a, constructed and operating substantially as set forth.

35,024.—Jasper Hoopes, of Philadelphia, Pa., for Improved Car Trucks:

I claim the combination of the plates, E E, semicircular projections, F F, frame, G, bands, f, bar, H, and guides, g, with the axles, B C C, in the manner and for the purpose shown and described.

35,025.—Shelden Hull, of Oxford, Conn., for Improved Washing Machine:

I claim the V-shaped box, A, in combination with the swinging bar, E, and the plungers, G G', attached thereto and working on the inclined ends, f, of the box, substantially as and for the purpose set forth.

I further claim constructing the plungers, G G', of a series of parallel plates or strips, c, the plates or strips, c, of one plunger, G, having their lower edges at right angles, with the end, f, on the box on which their plunger works, and the plates or strips, c, of the other plunger, G', having their lower edges forming an acute angle with the end, f, on the box on which their plunger works, substantially as and for the purpose specified.

35,026.—Lucinda Humphrey, of Tipton, Iowa, for Improvement in Skirt Protectors:

I claim a skirt protector made substantially as described and of any water-proof material, in combination with the lower portion of the petticoat.

35,027.—M. J. Knox, of Knox Corners, N. Y., for Improved Clothes Frame:

I claim a clothes frame composed of the three conjoined, but independent and separable frames, A B F G, with arms, J, constructed, combined and operating as shown and described.

[The object of this invention is to obtain a clothes frame which can be used either in the house or out of doors for drying clothes, and which, when not in use, can be folded up into a convenient and compact form, so as to occupy but little room.]

35,028.—T. S. Lambert, of Peekskill, N. Y., for Improvement in Shirts:

I claim a shirt with the bosom detached from the body at both sides, a part of the length downward from the upper extremity of the bosom and opening and closing as a flap, the shirt body and band being open in front beneath the bosom, the band of the shirt and the band of the bosom either or both being kept in place by elastic bands or cords, the whole substantially as set forth.

35,029.—W. A. Lighthall, of New York City, for Improvement in Portable Water Condensers:

I claim the combination with the drip reservoir, A, and dip plate, E, of the series of cooling tubes, B, arranged and operated as and for the purpose set forth.

35,030.—J. W. Lyon, of Brooklyn, N. Y., for Improvement in Padlocks:

I claim, first, Combining with the shackle two separate and independent sets of tumbler catches, one set to lock the heel and the other set to lock the front of the shackle, when arranged so as to overlap each other in such a manner as that the key shall come in direct contact with each of them at a point intermediate between their respective fulcra or pivots and by raising them up release them from the shackle, as described.

Second, I claim, in combination, the grooves, g, in the dogs, a, and the flanges or pins on the projecting part of the heel of the shackle, substantially as and for the purpose described.

Third, I claim, in combination, the projecting part of the heel of the shackle, and the tails or detectors of the dogs, e, which take into the staple, or front of the shackle, substantially as and for the purpose described.

35,031.—J. S. Marshall, of West Greenville, Pa., for Improvement in Bee Hives:

I claim the combination of the external and internal cases of the hive, when both are constructed and arranged as shown and described, so as to be capable of being spread open, as and for the purpose set forth.

[This invention consists in constructing a bee hive in such a manner that it may be unfolded, and the whole of its contents exposed and rendered accessible to the apiarian, for the purpose of transferring, dividing and feeding the bees, destroying drones, or old queens when unfertile, cleaning the hive, and giving the bees young queens, or combs with queen cells in them; also, for the purpose of renewing old combs, or changing the position of the same in the hive, all of which operations are performed by the successful apiarian.]

35,032.—G. W. Morgan, of Mount Vernon, Ohio, C. H. Tyler and John McClave, of New York City, for Improvement in Hammock Tents:

We claim, first, The combination of the upright side bars, A A, canvas cover, D, portable trestles or supports, F or G, transverse bars, B C, and the suspended adjustable sacking strips, E E, in the manner and for the purposes described.

Second, The combination with the suspended sacking strips, E, and the portable transverse bar, C, of trestles, F, constructed in the manner specified, for the purpose set forth.

35,033.—B. W. Nichols, of Fairhaven, Conn., for Improvement in Melodeons, &c.:

I claim, first, The combination of the spring clamps, b, with the projecting knob or catch, a, when constructed, arranged and fitted to produce the result, substantially as described.

Second, I claim the clamp, b, in combination with the triangular portion of the spring, k, when so fitted and arranged that the moving of the register, g, will force and hold back the jaws, substantially as described.

35,034.—W. T. Nichols, of Rutland, Vt., for Improved Ironing Machine:

First, I claim a smoothing iron, revolved horizontally by machinery, and capable of adjustment at pleasure upon any part of the ironing table, and also upon the top of the fire box, substantially as described.

Second, I claim heating rollers externally while they are revolved, for the purpose of ironing, substantially as set forth.

Third, I claim so applying a heated roller, for the purpose of ironing, that it shall prevent the two rapid forward movement of the garment, at the same time that it performs the act of ironing, substantially as described.

Fourth, I claim so applying heated rollers for the purpose of ironing that they shall revolve at varying rates of speed, for the purpose set forth, substantially as described.

35,035.—Charles O'Hara, of London, England, for Improved Propeller:

I claim the arrangement and operation of the semicylinder oscillating propeller, within the concave, a a, substantially as shown and described.

Having the radical face of the said propeller provided with corrugations, b, as shown and described.

The combination with the said propeller of the circular plate, c, as shown and described.

[An engraving of this invention will appear in our columns soon. Walter O'Hara, of Toronto, C. W., may be addressed for information respecting the invention.]

35,036.—George Palmer, of Littlestown, Pa., for Improvement in Metallic Grinding Mills:

I claim the movable, ventilated, longitudinal grinding plates, attached to a revolving cylinder, in sections, in the manner described, in combination with the concave-grinding plates secured to the covering, and made yielding and adjustable by springs and set screws, or their equivalents, in the manner as and for the purpose set forth.

35,037.—John Phelps, of Laporte, Ind., for Improved Washing Machine:

I claim the reciprocating, partially-rotating rubber, D, and the concave, C, in combination with the spring, H, adjustable weight, I, and sliding frame, F, all arranged for joint operation, as and for the purpose set forth.

[This invention relates to an improved clothes-washing machine of that class in which a reciprocating partially-rotating rubber is used in connection with a concave. The object of the invention is to obtain a simple and efficient means for regulating the pressure of the rubber on the clothes, and to this end the invention consists in having the bearings of the rubber shaft attached to a sliding frame, which has an adjustable weight and elastic bar connected with it, and arranged, as fully shown and described.]

35,038.—E. A. Pierce, of Brighton, Mass., for Improvement in Buckles:

I claim, as a new article of manufacture, a buckle, constructed substantially as described, with its frame, A, slotted roll, B, and ratchet and pawl, d e, for the purpose described.

35,039.—Susan D. Pinkham, of Fond du Lac, Wis., for Ventilator for Petrol Oil Lamps:

I claim the combination of the curved tube, inverted cup or disk, with a lamp, substantially in the manner and for the purpose set forth.

35,040.—A. R. Reese, of Phillipsburgh, N. J., for Improvement in Cutting Apparatus for Harvesters:

I claim the combination and connection of the finger beam, A, guard fingers, B, and face plate, C, by means of the bolts, a, when the whole are constructed, arranged and operated as described, in combination with a reciprocating cutter, for the purpose set forth.

35,041.—A. R. Reese, of Phillipsburgh, N. J., for Improvement in Finger Beams for Harvesters:

I claim the combination in a finger beam of the two sections, A and B, with the brace bar, C, and over-lapping plate, E, when constructed and connected, substantially in the manner and for the purpose described.

35,042.—Thomas Shaw, of Philadelphia, Pa., for Improvement in Tobacco Pipes:

I claim the annular chamber, D, between the inner bowl, C, and the outer bowl, B, the said chamber having vents, x y, arranged in respect to the vent, m, as and for the purpose set forth.

35,043.—J. H. Simonds, of New York City, for Improvement in Heaters:

I claim, first, Securing the tubes, F, in the hot-air chamber, D, by means of the flanches, c, on the upper ends of the tubes, fitted in sand, in recesses, d, in the top plate, e, of the hot-air chamber, and by having the lower ends of the tubes fitted over vertical tubular projections, h, on the bottom plate, i, of the hot-air chamber, and within sand, in recesses, j, which surround the tubular projections, h, substantially as set forth.

Second, The draught pipe, K, having its lower part, u, of conical form, with an opening, o, at its lower end, in connection with one or more draught tubes, H, and a chamber, J, or its equivalent, arranged in relation with the hot-air chamber, D, with or without deflector, G, and smokepipe, L, to form a self-cleaning device, as set forth.

[This invention relates to an improved air-heating furnace, of that class in which air-heating tubes are placed in a hot-air chamber, inclosed within walls of masonry or metal, to form a chamber to receive the cold air to be heated.]

35,044.—Ezekiel Smith, of Cold Spring Harbor, N. Y., for Improvement in Harvesters:

I claim attaching the cutters, B, to the bar, A, by means of the longitudinal adjustable cutter, B′, on the bar, A, provided with an oblique inner side, g, at its back part, and abutting against an oblique side, b, of its adjoining cutter, B, in combination with the pins, c, on the bar, A, and grooves, b, in the cutters, and with or without the bar, C, substantially as described.

[This invention relates to an improved manner of attaching the cutters of a sickle to its bar, whereby the cutters may be readily detached from their bar, when necessary, for the purpose of replacing new ones, or for properly grinding the same, when necessary, and also readily attached to their bar.]

35,045.—J. M. Taber, of Greenwich, N. Y., for Improvement in Hay Elevators:

I claim the combination of the gang forks, A A, united as described, with the block, G, and ropes or chains, E and F, in the manner and for the purpose specified.

35,046.—Wm. Tansley, of Salisbury Centre, N. Y., for Improvement in Tools for Paring Horses' Hoofs:

I claim, as a new and improved article of manufacture, a butteris or hoof-paring implement, formed of the two levers, A B, connected by a fulcrum pin, a, and provided respectively with a jaw, b, and knife, C, substantially as shown and described.

[The object of this invention is to obtain an implement which will supersede the ordinary knife, or butteris, as it is technically termed, for paring the hoofs of horses preparatory to shoeing them. The paring of the hoof with the ordinary knife or butteris is the most fatigueing part of the horse-shoer's work, and by means of the described invention it is believed that this labor can be very materially reduced.]

35,047.—Wm. Thomson, of Detroit, Mich., for Improved Apparatus for Evaporating Saccharine Juices:

I claim, first, The arrangement of the pit, A, with the conical arched spout, b, damper, e, and air holes, c, in combination with the pan, B, provided with heating tubes, d, all arranged substantially in the manner and for the purpose shown and described.

Second, The employment or use of the reciprocating scraper, E, in combination with the heating tubes, d, and pan, B, as and for the purpose specified.

35,048.—J. C. Tilton, of Geneseo, Ill., for Improvement in Ordnance for Use Under Water:

I claim the combination of the valve, D, fitted to the opening, C, and the sliding breech pin, K, constructed and operated substantially as described, through crank, H, and its connections.

35,049.—J. S. Topham, of Washington, D. C., for Improved Slide for Harness:

I claim the employment of the spring plate, B, and box, A, constructed and used, substantially as and for the purpose specified.

35,050.—J. R. Tunnicliff, of Van Hornesville, N. Y., for Improved Fire Alarm:

I claim, as an improved article of manufacture, a fire alarm, composed of a barrel, a, and quick match, b, combined and operating substantially as shown and described.

[This invention consists in the arrangement of a match, dipped in some composition that will ignite at a certain temperature, in combination with a gun barrel, in such a manner that whenever the temperature of the atmosphere surrounding the match rises beyond a certain degree—an occurrence which will certainly take place in case of a fire near by or in the same room in which the fire alarm may be located—by the ignition of said match a charge put into the barrel will be exploded, and the occupants of the room or house will be alarmed.]

35,051.—A. C. Twining, of New Haven, Conn., for Improvement in Apparatus for Cooling and Freezing:

First, I claim the condensing pump and condenser, in combination with the restorer, whether with or without the gas pump, and reciprocating vessel between them and the escape pipe. I claim the gas pump and precipitating vessel, in combination with the restorer, whether with or without the condensing pump and condenser intervening, and I claim the employment of any cold surface of the vacuum vessel, or of the circulating pipes, or the vapor pipe, as part of a precipitating vessel, or of a condenser in any way, substantially the same as above.

Second, I claim the use of cloths, as above, or other plates equivalent thereto, in combination with a distributing funnel, or any distributing plate or arrangement for the liquid; also the use of the colanders in a series, all substantially as above, and in combination with a restorer.

Third, I claim the above diaphragm arrangement for arresting mist or vesicles from vapor, in combination with an evaporating apparatus.

Fourth, I claim the clarifier, in combination either with the circulating cold current or the recondensed liquor from the restorer.

Fifth, I claim the combination of a vacuum vessel and a liquid cooler therein, with a pump or pumps to draw out from the vacuum vessel and throw back in a continuous circulation that freezing or refrigerating liquid.

Sixth, I claim the connection of the escape pipe, u u, or of any escape or leak outward with a cavity surrounding any part leaking inward, to obviate loss of either, as above.

35,052.—J. A. Whalen, of Brooklyn, N. Y., for Improvement in Revolving Firearms:

I claim the two pins, b c, and their springs, d and g, applied, in combination with each other and with the cylinder and cylinder frame, substantially as and for the purpose specified.

35,053.—Dyer Williams, of Syracuse, N. Y., assignor to himself and H. C. Silsby, of Seneca Falls, N. Y., for Improvement in Fire Engines or Locomotives:

I claim the combination of a fire engine with a locomotive engine for railroads, substantially as and for the purposes set forth.

35,054.—W. E. Worthen, of New York City, for Improved Faucet:

I claim, first, The combination, with the plug, of a faucet of locking pistons, vibrating in lines perpendicular to the plug, the combination being substantially as specified, and the pistons being arranged on the faucet, as set forth.

Second, The omission or cutting away of the metal at the head of a faucet, which is provided with a plug so bored, as described, that liquid shall pass through the bore of the faucet, and then through and out of the plug at right angles, or nearly so, to its former course, such omission or cutting away of the metal to be substantially to the extent and for the purpose described, and the faucet being so constructed that the liquid does not pass through the cavity formed by the omission or cutting away of the metal.

35,055.—Nathan Ames, of Saugus Centre, Mass., assignor to himself and Nathanial Evans, Jr., of Boston, Mass., for a Self-feeding Card Printing Press:

I claim, first, A rotatory, oscillating, reciprocating type bed and distributor, in combination with a rocking platen, substantially as described, and for the objects specified.

Second, The slide, I, combined and arranged, substantially as described, and for the purpose of rocking the platen and keeping the type bed parallel with it.

Third, Attaching the inking rollers to the continued axis, N, of the crank shaft, causing them to rotate with it, and carrying the type bed, and distributor in a circle round said roller, substantially as and for the object specified.

Fourth, So arranging the card-feeding apparatus on the top of the rocking platen, that the rocking of the same, in combination with the bail, S, shall feed down the cards at the proper time, substantially as set forth.

Fifth, Constructing the feeding plate, R, with separate fingers, r, and causing the n to slide in grooves between the raised strips, q, to prevent the face of the card from being soiled or scratched by coming in contact with that portion of the metal subjected to friction, substantially as described.

Sixth, Beveling the ends of the fingers, r, so as always to pass under the edge of the card and bring it up against the shoulder, c, and prevent the latter from ever catching on it more than one card at a time, substantially as described.

Seventh, Making the shoulder, c, somewhat inclined so as to form an acute angle with the surface of the raised strips, q, substantially as described and for the objects specified.

35,056.—Pierre Boisset, of Paris, France, assignor to himself and Barnardo Antognini, of New York City, for Improvement in India Rubber Heels of Boots and Shoes:

I claim making the heel piece, a, of an india rubber sole with a frame or frames, m, provided with points, o, incorporated therein, in the manner and for the purpose substantially as set forth.

35,057.—Pierre Boisset, of Paris, France, assignor to himself and Barnardo Antognini, of New York City, for Improvement in Boots and Shoes:

I claim the combination with a plate or nut, a, when the same is imbedded or incorporated within the india rubber or caoutchouc sole while being made, of a screw, so arranged and operating in connection with said plate, as to allow of the sole being screwed up and fastened to the upper leather, substantially in the manner and for the purpose specified.

35,058.—C. S. Brown (assignor to himself and J. H. Kennedy), of Homer, N. Y., for Improved Portable Sawing Machine:

I claim the combination and arrangement of the frame, A A, gate, D, dog-arms, L, fly-wheel and crank, G F, and saw, K, substantially in the manner and for the purpose shown and described.

I also claim, in combination with the described machine, the clamp hooks, o, or equivalent device, for holding the dog-arms, L L, rigidly to the frame, A A, to serve as levers for trundling the machine on the fly wheel, G, substantially as set forth.

35,059.—J. W. Douglas (assignor to W. and B. Douglas), of Middletown, Conn., for Improvement in Pumps:

I claim the combination of a vertical pump cylinder, the valve chest in position, as described, and the lower end of the cylinder being made impertorate, substantially in the manner and for the purpose set forth.

I also claim the use of a tinned iron plate, P P, to aid in forming the floor of the horizontal passage, O2 O2, extending from the front to the rear of the valve chest, substantially in the manner and for the purpose described.

35,060.—William Heston (assignor to A. H. Comstock), of Bedford, Ohio, for Improvement in Horse Powers:

I claim the self-adjustable standards, H, and springs, I, in combination with the rollers, K, when these several parts, are arranged in their relation to the crown wheel, B, and pinion, D, as and for the purpose specified.

35,061.—W. H. Matthews, of Chelsea, Mass., assignor to Union Glass Co., of Somerville, Mass., for Improvement in Glass Deflectors for Lamps:

I claim the described mode of constructing the glass deflector holder, viz., of the separate cap and base rings provided with means of connecting them as set forth, in order that they may be applied to the glass deflector and its flanch, as specified.

35,062.—Stuart Perry, of Newport, N. Y., assignor to C. H. A. Carter, of New York City, for Improvement in Tread Horse Powers:

I claim the use of two or more interlaced reciprocating treadles, to be operated upon by a horse or horses, for the purpose of making a horse-power machine, substantially such as described.

I also claim in combination with two or more reciprocating interlaced treadles, the cams underneath them for bringing them alternately into contact with, and lowering them away from, the feet of the horses, substantially as described.

I also claim, in combination with two or more treadles acted upon alternately by the feet of the horse or horses, the racks, and segmental gears for producing a continuous rotary motion out of the alternate reciprocating motion of said treadles, substantially as described.

I also claim returning each of the treadles after it has completed its working traverse, to its normal working position by means of the mechanism described and represented, or its substantial equivalent.

35,063.—Stuart Perry, of Newport, N. Y., assignor to C. H. A. Carter, of New York City, for Improvement in Circuit Horse Powers:

I claim, in circuit horse powers, the hitching of the team or teams, to an endless belt or band, that travels around with the team, for the purpose of transmitting the power of the team to a pulley, shaft or wheel, whence it may be applied to any machinery, substantially as described.

I also claim, in combination with an endless belt or band that has a turn or bite around a drum, shaft, pulley or wheel, a self-acting connecting and disconnecting mechanism, whereby the draft may be continuous though the band or belt is let go, and seized by said mechanism for the purpose set forth.

35,064.—Stuart Perry, of Newport, N. Y., assignor to C. H. A. Carter, of New York City, for Improvement in Speed Regulators for Horse Powers, &c.:

I claim, first, In connection with a speed regulator for machinery, the arranging of the weights that are to be centrifugally acted upon, in the hollow arms of the wheel, A, in connection with restraining or regulating springs, substantially as and for the purpose set forth.

I also claim, in combination with the weights acted upon centrifugally by the wheel, A, the loose wheel, E, belt, g, and pulley, F, or their equivalents, constructed, arranged and operating substantially as described.

I also claim, in combination with a brake which is operated by means of weights acted upon centrifugally, the poise, J, applied on the retrograde side of the pulley, F, substantially as and for the purpose described.

35,065.—John Schatt (assignor to himself and S. P. Mervine), of Philadelphia, Pa., for Improvement in Dry Gas Meters:

I claim the employment, in dry gas meters, of levers, C C′, provided each with a slot, e, in its one end, for the reception of a traversing pin, f, the same operating together substantially in the manner set forth and for the purpose specified.

I also claim making the knuckle, D, to have only a single central arm, d3, as set forth, and connecting it with the valve rod levers, provided with suitable slots in their connecting end, substantially in the manner described and set forth, for the purpose specified.

35,066.—James Sheridan, of St. Louis, Mo., for Improvement in Snow Plows:

I claim the combination, arrangement and mode of supporting the plow beam, F, with the groove, E′, plow and car body, as and for the purpose set forth.

EXTENSIONS.

5,536.—Charles Goodyear, deceased, late of New Haven, Conn., for Improvement in Making Hollow Articles of India Rubber. Patented April 25, 1848:

I claim the described process of making hollow spheres, various hollow toys or other hollow articles of caoutchouc, the same consisting in the employment of a mold and heat, and air, substantially in the manner and under the circumstances set forth.

5,522.—Lewis Moore, of Bart, Pa., for Improvement in Seed Planters. Patented April 18, 1848:

I claim, first, The particular combination and arrangement of the levers, C, round, P, bar, C′*, journals, p, with the hopper, B, frame, A, and notched supports, g, for moving the hopper, and sowing cylinders, in the arc of a circle, for the purpose set forth.

Second, I claim the combination of a segmental slotted box plates, I′, containing the bearings of the cylinder axles with the hopper, arranged and operated in the manner and for the purpose set forth.

Third, I claim the manner of attaching the tubular drills, L, to the forked rods or bars, K, by the means of the wood and iron pins, q r, and flanges or wings, s, as described, and for the purpose set forth.

Fourth, I claim the combination of the chains, O, with the tubes, L, and bar, C′, of the hopper frame by which the tubes are raised or lowered simultaneously with turning the hopper on its axis, as described.

5,529.—Samuel Hall, deceased, late of Pittsburgh, Pa., for Improvement in Plows. Patented April 25, 1848:

I claim, first, The manner of securing the beam to the body of the plow by means of the curved termination of the rear end of the beam, the socket, p, between the mold board and land side, the ear, g, projecting from the mold board, with the slot, J, in the same, and the screw bolt, h, the whole combined and operating substantially in the manner and for the purpose set forth.

Second, I also claim, in combination with the foregoing-described method of confining the beam to the body of the plow, the manner of giving a lateral adjustment to the front end of the beam by means of the wedge, e, substantially as set forth.

Third, I also claim, in combination with the method of securing the beam to the body of the plow, the manner of combining the handles with the beam by means of the projecting arm, s, the aperture, W, and slot, n, in the same, and the screw bolt, i i, combined and operating with the front end of the beam, substantially as set for h.

Fourth, I also claim the manner of forming and uniting the wrought share with the point and cutter, by the combination of riveting and welding, substantially in the manner and for the purpose set forth.

5,531.—Asa Whitney, of Philadelphia, Pa., for Improvement in Annealing and Cooling Cast-iron Car Wheels. Patented April 25, 1848:

I claim the process of prolonging the time of cooling, in connection with annealing railroad wheels in the manner described, that is to say, the taking them from the molds in which they are cast, before they have become so much cooled as to produce such inherent strain on any part as to impair its ultimate strength, and immediately after being thus taken from the molds, depositing them in a previously-heated furnace or chamber, so constructed of such materials and subject to such control that the temperature of all parts of the wheels deposited therein may be raised to the same point (say a little below that at which fusion commences), when they are allowed to cool so fast and no faster than is necessary for every part of each wheel to cool and shrink simultaneously together, and no one part before another.

RE-ISSUE.

1,304.—D. G. Littlefield, of Albany, N. Y., for Improvement in Hot-air Furnaces. Patented Oct. 9, 1860. Ante-dated July 3, 1860:

I claim, first, The combination of the cold air channel, H, the perforations, S S S S, the register, S′, and the damper, R, as described.

Second, Combining in hot-air furnaces the shell or covering, L, the register, S′, for opening and closing the top of the shell, as set forth, the perforations, S S S S, opposite or near the fire pot, and the cold air channel, H, substantially as described.

DESIGN.

1,567.—W. H. Core (assignor to himself and A. Lorenz), of New York City, for Design for a Show Case.

PATENTS FOR SEVENTEEN YEARS.

The new Patent Laws enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the government fee required on filing an application for a patent is reduced from $30 down to $15. Other changes in the fees are also made as follows:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for Design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, excepting reference to such countries as discriminate against citizens of the United States—thus allowing English, French, Belgian, Austrian Russian, Spanish, and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms.

During the last sixteen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by the Inventors throughout the country, we would state that we have acted as agents for more than FIFTEEN THOUSAND Inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of Inventors and Patentees at home and abroad. Thousands of Inventors for whom we have taken out Patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the Inventors whose Patents were secured through this Office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than are employed at present in our extensive Offices, and we are prepared to attend to Patent business of all kinds in the quickest time and on the most liberal terms.

The Examination of Inventions.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a reply written corresponding with the facts, free of charge. Address MUNN & CO., No. 37 Park-row, New York.

Preliminary Examinations at the Patent Office.

The advice we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a Patent &c., made up and mailed to the Inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh-streets, Washington, by experienced and competent persons. More than 5,000 such examinations have been made through this office during the past three years. Address MUNN & CO., No. 37 Park-row, N. Y.

How to Make an Application for a Patent.

Every applicant for a Patent must furnish a model of his invention. If susceptible of one; or if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the government fees by express. The express charge should be prepaid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of Munn & Co. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & Co No. 37 Park-row, New York.

Caveats.

Persons desiring to file a Caveat can have the papers prepared in the shortest time by sending a sketch and description of the inventio The government fee for a Caveat, under the new law, is $10. A pamphlet of advice regarding applications for Patents and Caveats, in English and German, furnished gratis on application by mail. Address MUNN & CO., No. 37 Park-row, New York.

Foreign Patents.

We are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business, we have offices at Nos. 66 Chancery-lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through our Agency.

Inventors will do well to bear in mind that the English law does not limit the issue of Patents to Inventors. Anyone can take out a Patent there.

Circulars of information concerning the proper course to be pursued in obtaining Patents in foreign countries through our Agency, the requirements of different Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park-row, New York, or either of our Branch Offices.

Rejected Applications.

We are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief history of the case, inclosing the official letters, &c.

Assignments of Patents.

The assignment of Patents, and agreements between Patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park-row, New York.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with Patent property or inventions to call at our extensive offices, No. 37 Park-row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid), should be addressed to MUNN & CO., No. 37 Park-row, New York.

Notes and Queries

G. E. C., of N. Y.—A cheap and simple filter for your cistern may be made of a box about two feet square and eighteen inches deep. Construct it with a perforated false bottom and leave a space under it of about three inches for the filtered water to flow by a pipe in the bottom into the cistern. Layers of small pieces of charcoal and washed sand should be placed to a depth of ten inches upon the false bottom, and a piece of canton flannel should be nailed over all on strips at the side of the box. The water to be filtered should fall upon the straining cloth and leave a space of four or five inches to the top of the box. The straining cloth must be boiled in soap suds and washed occasionally, and the layers of filtering materials should be washed or renewed once a year and perhaps oftener.

A. R. E., of N. H.—A one-horse power steam engine will drive a 20-inch circular saw, but we advise you to get a more powerful engine, say four or five horse power. A portable engine may be the most convenient for you, but it is not preferable on account of any economy in fuel.

J. K., of Cal.—Aluminum has become cheap in comparison with what it was seven years ago by the discovery of improved processes for recovering it from its oxides. We believe that there is still great room for improving the modes employed in mining and treating gold quartz.

W. B. G., of N. C.—All attempts to deduce the forms or lines of vessel from scientific principles have proved fruitless, and it is not at all probable that this problem will ever be solved by theory. The practical manner of determining the lines of vessel is fully described in Tredgold on this steam engine.

J. L. C., of Md.—Traction engines are used to considerable extent in England for drawing loaded wagons on common roads See page 250 of our current volume.

Gulielmus, of Ill.—Smoke consists of solid particles of carbon which are heavier than the air, and which are carried up by ascending currents of gas or vapor. It is probable that the reason why it falls in damp weather is that the vapor is cooled by coming in contact with the small globules of vapor in the air, and is thus condensed.

J. W., of N. J.; E. C. M., of N. Y.; H. P., of N. Y.; M. B. C., of Iowa; F. B., of D. C.; J. J., of N. J.; R. C., of N. Y. G. S., of N. J.; J. R., of Wis.; and H. G., of Ohio. Your communications are received and we thank you for your suggestions. All of those which are adapted to our paper and which have not already been discussed in our columns will receive attention.

P. A., of N. Y.—Davies and Peck's Dictionary of Mathematical Science says that a billion is one thousand millions. So far as we know all modern works of high character adopt this method of notation.

R. G. J. K.—Correspondents who write to us expecting to receive attention to their communications must sign their names to them so that we may know with whom we are dealing. All unsigned letters are thrown away.

G. T., of Mass.—An invention can be patented after it has been introduced into public use provided it has not been used over two years previous to the application for the patent.

M. H., of Pa.—We do not know the names of any manufacturer of Blanchard's Lathe.

K. L. B., of Phila.—To recover the silver from your mass of cotton and paper which is saturated with the nitrate of silver, burn the cotton and carefully collect the ashes. Mix the ashes with about four times their weight of carbonate of soda and melt the mixture in a crucible. You will have the silver in a metallic state.

C. G., of Ohio.—Iron plates laid upon a layer of india rubber have been tried experimentally in England, and condemned (perhaps too hastily) according to the accounts which we have received. We have already suggested the use of thin steel plates laid upon thick plates of tough iron for ship armor. Your views accord with our own on this subject, but it is only by thorough experiment that the best form and quality of plating can be determined. We cannot pass an opinion upon your war engine until we know something more about it.

L. A. B., of Ill.—Quicksilver is used in recovering gold from quartz by agitating it with ground quartz in water. Mercury will take up about its own weight of gold, but it is never saturated to such an extent in practice.

J. J., of Maine.—We have no rule for calculating the penetrating power of cannon balls in water at various depths.

E. C. H., of N. H.—You are certainly mistaken respecting the explosion of gun powder in the battles between our armies and the disunion forces, being the cause of the great falls of snow in the northern districts this winter. A long continuance of easterly winds carried great quantities of rain from the Atlantic into the interior, where it was converted into snow by the cold atmosphere. It is true that great battles are usually succeeded by rain storms, but these do not extend far beyond the scenes of contest.

D. E. W., of N. Y.—Communicate with McAllister & Brother, No. 728 Chesnut street, Philadelphia, respecting the manufacture of camera lucidas.

J. H., of Mass.—In drawing a load on a carriage the resistance to be overcome depends entirely upon the friction of the axle in the hub and upon the rolling friction of the wheel on the ground and it will therefore require the same power to overcome this friction whether applied directly to the axle or to a 5-½-foot gear wheel bolted to the 6-½-foot wheel?

Money Received

At the Scientific American Office on account of Patent Office business, during one week preceding Wednesday, April 30, 1862:—

A. F. T., of N. Y., $40; G. B. W., of N. J., $20; F. and C., of Mich., $25; J. R. A., of Pa., $15; B. L., of Vt., $25; W. H. D., of N. Y., $42; S. and H., of N. Y., $30; C. R., of Pa., $30; N. Z. P., of Ill., $40; A. B., of Canada, $15; R. S., of N. Y., $15; A. B. P., of Cal., $25; L. and K of Ill., $25; O. H. N., of Conn., $15; J. O., of Ill., $15; C. and A., of Conn., $20; H. K. A., Jr., of Iowa, $20; K. M., of N. Y., $40; K. and A. of N. Y., $40; H. C. F., of Vt., $15; C. A. T., of Mich., $15; D. H., of N. H., $211; E. M., of Conn., $15; C. O., of Ill., $15; J. and G., of R. I., $30; S. R. B., of Ill., $25; J. A. A., of Conn., $15; C. and B., of Mich., $30; J. H. I., of Ill., $15; J. R and J. A. S., of Ill., $25; J. A. F., of O., $25; C. E. S., of Md., $40; E. W., of N. Y., $15; J. H. B., of N. Y., $20; E. S., of Conn., $20; J. B. D., of Conn., $15; J. H. M., of N. Y., $15; P. and S., of Ill., $15; A. J. G., of N. Y., $25; T. McD., of Pa., $15; F. B., of Me., $15; G. P., of Mass., $25; B. F. H., of N. H., $15; J. W. S., of N. J., $25; J. S. W., of Va., $15; S. and F., of Pa., $15; B. A. M., of Conn., $15; D. F. H., of Mich., $15; T. W. W., of Mich., $40; O. E. M., of Ill., $12; A. McN., of N. J., $40; B. S. and J. M., of Pa., $20; G. T., of Mass., $20; J. D. and J. T. S., of N. Y., $20; G, R. V., of N. Y., $40; J. S. F., of Ill., $20; E. E., of Cal $20; T. P., of N. Y., $10; R. G. H., of Mass., $43; J. M. M., of Conn., $25; P. N. H., of N. J., $25; A. B., of N. J., $25; L. E. O., of Conn., $20; A. I., of Iowa, $20; J. J. M., of Conn., $40; W. H., of Iowa, $20; F. and W., of Mass., $33; F. S. O., of N. Y., $3); J. S., of N. Y., $25; F. A. De M., of N. Y., $25; J. F. R., of N. Y., $25; G. H. H., of N. Y., $25; C. W. J., of N. Y., $20; W. G., of Ind., $20; J. C. G., of Mass., $40; E. T. S., of N. Y., $40; M. H. S., of N. Y., $25; A. G. B., of Conn., $25; D. N. D., of N. J., $25; G. R. V., of N. Y., $45; G. M. T., of N. Y, $15; O. C. S., of Mass., $50; W. H. H., of N. Y., $30; D. P. P., of Cal., $15; A. J. L., of ——, $25; F. C. L., of N. Y., $25; A. S. F., of N. S., $45; J. M., of Conn., $40; C. B. S., of Mass., $25; C. C., of Iowa, $15; J. B. G., of Iowa, $25; S. S. W., of Pa., $25; E. J. W., of N. Y., $20; C. C., of Mass., $20; K. M., of N. Y.

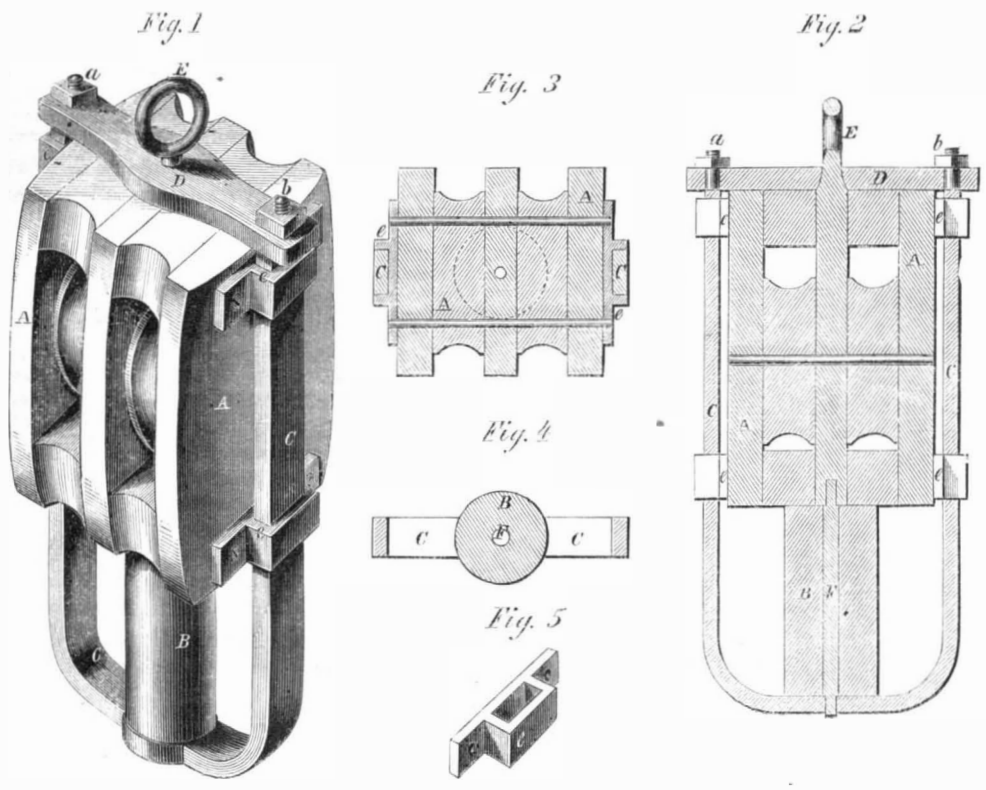
Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from April 23 to Wednesday, April 30, 1862:—

R. B., of France; G. B. W., of N. J.; S. R. B., of Ill.; J. and G., of R. I.; F. and C., of Mich.; P. N. H., of N. J.; A. J. G., of N. Y.; J. H. A., of N. Y.; F. and W., of Mass.; L. and K., of N. Y.; J. A. F., of Ohio; G. R. V., of N. Y.; D. H., of N. H.; A. B., of N. J.; A. G. B., of Conn.; F. A. De M., of N. Y.; M. H. S. of N. Y.; J. M. M., of Conn.; J. J. M., of Conn.; O. E. M., of Ill.; J. R. and J. A. S., of Ill.; J. C. G., of Mass.; J. F. R., of N. Y.; G. P., of Mass.; C. R., of Pa.; B. L., of N. J.; J. S., of N. Y.; F. S. O., of N. Y., (2 cases); C. E. S., o Md.; D. N. D., of N. J.; E. T. S., of N. Y.; G. H. H., of N. Y.; W. H. D., of N. Y.; K. and A., of N. Y.; H. M. P., of Mass.; C. B. S., of Mass.; J. R. G., of Ill.; F. C. L.; of N. Y.; R. G. H., of Mass.; W. H H., of N. Y.; J. B. G., of Iowa; O. C. S., of Mass.; J. W. S., of N. Y.; R. G. H., of Mass.; F. and W., of Mass.; E. T. S., of N. Y.; J. J. M., of Conn.; K. M., of N. Y.; K. and A., of N. Y.

Improved Ship Block.

It is well known that the booms of fore and aft sails often swing out with great force, and bring up on the tackle with a jerk, to the great risk of the blocks, the ropes, ring bolts, and the boom itself. The object of this improvement is to relieve this jerk by a peculiarity in the construction of the block, which renders it elastic in the direction of the pull. It consists in the interposition of an india-rubber spring between the block and its strap, and will be readily understood by the engravings, of which Fig. 1 is a perspective view; Fig. 2 a longitudinal section; Figs. 3 and 4 transverse sections; Fig. 5 modified guide for the block to slide in. A is the block; B is the spring of india rubber; C is the iron strap inclosing block and spring; D is an iron plate across the head of the block, connected with the strap by screws and nuts at *a b*; E is the eye connecting the block to the boom; F is a pin, attached at one end to the block, and passing through the spring with the other end, extending through an aperture in the seat of the strap; *e e* are plates, fastened to the sides of the blocks with projections that embrace the strap, to keep the block and strap in proper relative positions, and to allow the block to slide within the strap during compression and expansion of the spring.

This block was invented by the late Obed Hussey. The patent was granted on the 28th of December, 1858, and further information in relation to it may be obtained by addressing Mrs. Eunice B. Hussey, at Baltimore, Md. [See advertisement on another page.]



HUSSEY'S IMPROVED SHIP BLOCK.

Improved Post-Office Hand Stamp.

It is generally known that postmasters are required to mark upon every letter mailed at their offices the date of its being mailed and the name of the office. At all the larger offices this marking is done by means of a stamp. The stamps are prepared to receive type upon the ends of which the letters and figures are formed; and each day the stamp is made up by inserting the proper type to form the correct date. The stamps with the necessary type are sent through the mails to the several offices where they are required from the Post-Office Department, the type being placed in a small tin box. Of course the type are very liable to become scattered and lost at the offices and considerable inconvenience results from this cause. The accompanying engraving illustrates a device by which this inconvenience is effectually avoided, and other important advantages are secured.

It consists in forming the letters and figures upon the peripheries of a series of rings which are secured in the end of the stamp, and the date is formed by turning these rings so that the proper letters and figures will be presented at the face of the stamp.

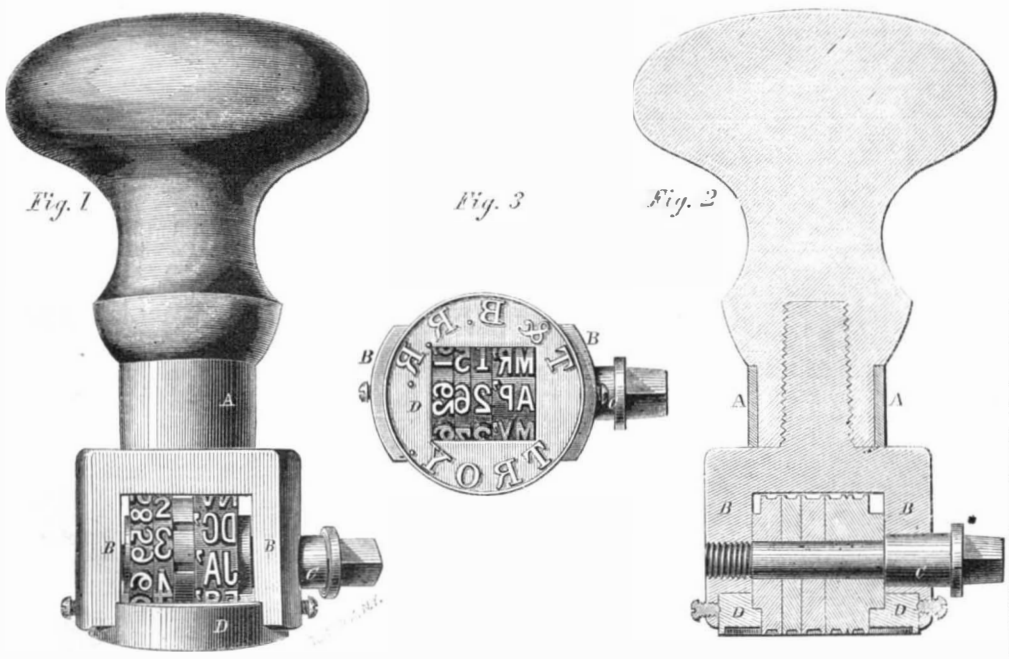
Fig. 1 is a perspective view of the stamp; Fig. 2 is a vertical section, and Fig. 3 is a view of the face. The stamp of brass or other suitable metal, is formed with two cheeks, B B, between which are four flat rings or disks, held in place by a bolt, C, through their axes. A shoulder is formed on this bolt, as shown clearly in Fig. 2, so that when the bolt is screwed into the cheek, the disks are prevented from turning. The letters and figures are formed upon the peripheries of the disks. Upon the disk at the right hand are the initials of the names of the twelve months; upon the next disk are the Figs. 1, 2 and 3; and upon the next are the nine digits with a cipher, these two disks being designed to print the day of the month. The last disk at the left has the figures for the ten years of the current decade. The date is formed by turning the several disks so as to bring the proper letters and figures to the face of the stamp, when they are held in position by turning the bolt, C, by means of a key which fits its head, and pressing its shoulder firmly against the disk at the right.

Each stamp is provided with a face plate upon which the name of the office is engraved. This plate is represented in Fig. 3. A square slot is cut out of the middle to permit the letters and figures upon the periphery of the disks to come down to the same plane as the letters upon the face plate. This plate is made in a separate piece and is secured to the stamp by screws in order that it may be readily renewed in case of becoming worn, or if any change is desired in the letters upon it.

It will be seen that this stamp is as perfectly adapted to the use of railroad companies for stamping the dates upon their tickets as for post offices, and our engraving represents it as prepared for this purpose.

This mode of securing type in a stamp, not only prevents any of them from being lost either at the office or in transmission, but it keeps them ready at hand where they may be found whenever wanted, and in a situation where they are very easily adjusted for use.

The patent for this invention was granted January 14, 1862, to the inventor, Marcus P. Norton, to whom inquiries for further information may be addressed, at Troy, New York.



NORTON'S HAND STAMP FOR POST OFFICES, RAILROADS, ETC,

FROM THE STEAM PRESS OF JOHN A. GRAY.