Correspondence.

"Dry-Printing" Greenbacks.

MESSRS. EDITORS:—Having been behind the scenes, and having full information respecting the history and success of the "dry printing" experiment, I beg you will allow me to describe the process. What the Hoe press is to the old hand-press of Franklin's time, the hydrostatic press at the Treasury Department is to the hand-press of the American and Continental Bank-Note Companies of to-day. In all sincerity, I confess to a full belief in the practical possibilities of dry printing by hydrostatic power; but while I believe thus, I cannot be blind or unmindful to the facts actually accomplished, for they are vastly less than the public has been led to suppose. Good printing can be done by the process. This is the first desideratum; but the other one, of speed, is unattainable, or at least problematical at present. An article in the *Cincinnati Gazette* on this subject says:—

"Preparations are being made to substitute dry printing for wet, by which there will be at least two advantages gained—speed and better work." "By the present process of printing, each pressman takes about 500 impressions per day. By the hydrostatic presses it is expected that from 300 to 500 impressions per hour will be taken."

It is true that preparations have been made for a long time past; but the end is not yet, nor is the substitution likely to take place this year, for there are more obstacles in the way than the sanguine projectors happened to see. There is no lack of pressure necessary to print, and hence good printing can be done; but when we come to the question of speed on a large scale with a large number of presses, there will be an enormous expenditure of power necessary to do the work; that expenditure will be out of all proportion to the work accomplished. There are other drawbacks to fast printing by the dry method, which are these:—Toughness of the ink suited to the process; extra motions to perform in putting the plate (after it is wiped) upon the chase, and the paper upon the plate; to let the chase-frame down to the work; then to push the chase under the press. The pressure having been drawn, it has to be pulled out, the frame raised, paper taken off, and the plate lifted to the stove again. These extra motions are not laborious for a single impression, but they count largely in a day's work. The third drawback is the necessity of a renewal of the rubber in the chase-frame just mentioned. This rubber will last to make from 200 to 800 impressions, depending upon the quality of the rubber and how the printer wipes his plate—if close, less; if full, more, as the pressure in each case must be increased or diminished in proportion, or else the work will be either light or mashed in appearance. The greater the pressure the sooner the rubber requires renewal. To do this requires from 20 to 30 minutes' time, meantime the printer and his valve-tender has a rest. This has to be repeated every 400 impressions, for instance, and, according to report, this is about the average number the press will turn out, so that at the end of every hour's work 20 to 30 minutes must be spent in waiting, which will allow of only six hours of actual labor for a day of eight hours, thus making a loss of 25 per cent in time alone. Now, if the eighty presses mentioned were to be used for one year, the loss in time would amount to nearly $100,000.

As before remarked the speed of the dry printing process has been vastly overstated. To my certain knowledge, not more than 75 good impressions per hour can be turned out by this process, and up to date not more than 400 per day have been struck off. This makes an average of only fifty impressions per hour. This duty is being performed under favorable circumstances, there being only a few presses at work. Set them all at work, and there will be a falling off in the amount of work, if not in the quality. These large calculations as to speed are mathematical calculations. They should have been mechanical, allowing a deduction of fifty per cent for friction and other hindrances. Then we should come nearer the amount of work the system is capable of turning out.

We are also informed in the article alluded to previously that pumping machinery is being fitted up, and that all will soon be in motion. The said pumping machinery has been rigged and re-rigged a multitude of times; but it has had a very bad habit of bursting or breaking, so much so that the machinists on the work became heartily sick of it. And it is believed that if the Congressional Committee had known the facts in the case, and had been guided by those facts alone, their investigations into that branch of printing would have resulted in its condemnation. It is also stated that eminent men in science and mechanics had been consulted to test the feasibility of the process. This is undoubtedly true in this sense. The plan may have been submitted, but it was tested to little purpose, if we are to judge by the results that have followed its actual working. Of the eighty presses contracted for and built according to that plan, not one is strong enough to stand the required pressure; and over one-third of the number have already burst. The first receiver was a failure from a like cause, and the pumping machinery is but little better, it being too light, the pumps too small and numerous, and withal running too fast HYDROSTAT.

West Paris, Me., Oct. 9, 1864.

Feeding Gold Fish.

MESSRS. EDITORS:—Having noticed in your paper of October 15, 1864, a communication regarding the keeping and feeding of gold fish, I feel inclined (being somewhat experienced) to give you some information on the subject. With reference to the keeping of gold fish, I may state that I have a common pine tank (about three feet in length and two feet in width, being two and one-half feet deep), which holds some thirty gallons of well water, with which it is kept constantly filled. As "your correspondent" makes no allusion to his method of keeping gold fish, I am in doubt as to whether my plan will suit him. However, about the middle of June, 1863, I placed in this tank, which stands in an exposed situation, about forty fish (twelve or fifteen of them gold fish, and the remaider "turners," a fish which, when taken from the pond, is similar in color to the cat fish or bullheads, but which ultimately turns as brilliant a gold as its companions, hence the gold fish with black backs), which, with the exception of a few, are all alive, and since the time I put the fish into the tank the water has been changed but twice; once last winter, when I put the tank in the cellar, and once this spring, when I brought it out again. And, what is more remarkable, the fish have not been fed since June, 1863. But on the inside of my tank is a green, slimy moss, that, by decomposing the water, supplies oxygen to the fish during the day, and at night absorbs the carbonic acid gas, which the fish have given forth. If your correspondent will regulate the number of his fish to the quantity of water in which he keeps them (say two small fish or one good sized one to a gallon of water), and if instead of cleaning the sides of his tank he allows the green confervae to grow, he will find that nature will provide better food for his fish than anything he can give them. Such is my experience; but the writers say that "feeding is a very important matter; it should be performed twice or thrice a week at least. Bread and hard-boiled eggs are good staple food; but fles, small spiders, and any soft insects will be greedily accepted and demolished in a general scramble. Food not eaten should be immediately removed, or the water may get tainted; and care should be exercised not to overfeed at any one time, and not to feed too frequently. F. T.

Bay Ridge, L. I., Oct. 17, 1864.

[The oxygen furnished to the fish by the plant comes from the decomposition of carbonic aid, not from the decomposition of water.—EDS.

Current Expense of Hill's Telegraph Battery.

MESSRS. EDITORS:—A few months ago you published an illustrated description of a telegraph battery invented by Dr. E. A. Hill, of Galesburg, Ill. This battery has been in use on the Burlington and Missouri River Line for the past ten months, and I would like to make a statement of its economical working for the information of telegraphers and electricians generally.

The line at present extends from Burlington to Ottumwa, Iowa, a distance of 75 miles, and has seven offices in circuit. This line was fed for six months by a battery of 26 cups at Burlington, but for four months past an additional section of 14 cups has been used at the Ottumwa terminus, making a total battery power of 40 cups. The expense for 10 months of the Burlington battery by careful estimate may be stated as follows:—

60 lbs. sulp. copper at 19, 20 and 25c. per lb......	$11 70
17 lbs. zinc at 20c. per lb..........................	3 40
Total for ten months..................................	$15 10

This is at the rate of $1 50 per month, or about 5 7-9 cents per cup per month.

The battery at Ottumwa cost 5 11-14 cents per cup monthly. The battery evolves a remarkably steady and reliable current, and is not perceptibly injured by "short circuits" and ground connections in its immediate neighborhood, and is capable of feeding eight or ten different circuits constantly.

Permit me to suggest that superintendents and engineers of the different lines in the United States and Canadas be requested to furnish expense estimates of the various batteries in use, for publication in the SCIENTIFIC AMERICAN, as your paper is read generally by telegraphers throughout the country. It is very desirable, especially during the present high prices, to ascertain the most economical and reliable battery power in use. Reports from the various lines would prove a stimulus to inventors, and be of great benefit to telegraph interests.

JNO. L. WAITE,
Supt. B. and Mo. R. Telegraph.

Burlington, Iowa, Oct. 19, 1864.

Every One to His Own Trade.

MESSRS. EDITORS:—Allow me to differ with your correspondent in relation to "Boiling Clocks." His idea strikes me as being simply ridiculous. A timepiece, either watch or clock, should not be tampered or fooled with, but should, in order to keep correct time, receive the best of care. Let us grant that the boiling will remove grease; yet all the dirt and dust which boiling will not dissolve still remains in the pivot holes and leaves of the pinions, and can only be removed by "pegging" them out, which cannot be done while the clock is together. Then again, three-fourths of those that undertake to boil their clocks would leave them damp, so they would rust, while one-half of the remaining fourth would heat them so much in drying that the temper would be spoiled, thereby being "penny wise and pound foolish." It seems to me that a person can afford to pay 75 cents to have a clock that serves him faithfully night and day cleaned once in two years. I would, therefore, recommend all persons wishing their timepiece cleaned to carry it to some good workman, and have it done as its merits deserve. And all person wishing to obtain patents and have the papers made out correctly, not to undertake to do it yourselves, but to apply to the Scientific American Patent Agency. Such is the advice of

AN OLD WATCH AND CLOCKMAKER,

who does not believe in "biled" clocks, botched-up patents or quack doctors.

Hartford, Conn., Oct. 17, 1864.

Another Query About a Wheel.

MESSRS. EDITORS:—In experimenting on the pendulum for the purpose of securing some practicable method of making it perfectly isochronous, I was led to try a simple wheel rocking back and forth upon a smooth, hard surface. As this motion would give me the cycloidal or isochronous curve, I had hoped it would produce or approximate regularity in its beats. To this end I took two small, thin wheels, beveled their edges, and fastened them at a small distance apart, so that they would not fall down, and, after loading them on one side to make them slightly eccentric, set them in motion upon a plate of glass. I soon found, however, that their motions were not of a uniform length in time, and, moreover, they did not continue in motion more than two minutes.

Not feeling satisfied with this result, I took two other wheels of the same size and weight as before, and joined them together at one edge by a hinge. I thed gave them an angle of about 12 degrees, and set them in motion as before, when I discovered that their beats were not only more nearly isochronous than in the first case, but that the vibrations continued for nineteen minutes. And now I should like to know the reason for this disparity in time. It cannot arise from excess of friction in the first case, because the surface exposed to the glass was nearly the same in the last experiment. Does it arise from the peculiar arcs described by the wheels in their vibrations back and forth? and if so, what are its properties? Is there any angle at which they might be placed that their beats would become isochronous? Can any of your readers tell?

A. S. C.

Formulæ for Cutting Screw Threads.

MESSRS. EDITORS:—On page 198, present volume, you ask "for methods for calculating change wheels for cutting screws, both fractional and even pitches." For the benefit of your machinist subscribers I send you the following simple and correct rules:—

FOR SINGLE GEARED LATHE.

Divide the number of threads you wish to cut (to the inch) by the pitch (number of threads to the inch) of the feed screw, and multiply the quotient by the number of teeth on the driving wheel, and the product is the number of teeth on the wheel driven.

Examples.

To cut 9 threads, pitch 5, driving wheel 25 teeth.

$\frac{9}{5}=1\cdot8\times25=45$ teeth on the wheel driven.

To cut $9\frac{1}{2}$ threads, pitch 5, driving wheel 20 teeth.

$\frac{9\cdot5}{5}=1\cdot9\times20=38$ teeth on the wheel driven.

To cut 10 threads, pitch 6, driving wheel 30 teeth.

$\frac{10}{6}=1\cdot666666\times30=50$ teeth on the wheel driven.

To cut $10\frac{1}{5}$ threads, pitch 5, driving wheel 25 teeth.

$\frac{10\cdot2}{5}=2\cdot04\times25=51$ teeth on the wheel driven.

FOR DOUBLE GEARED LATHE.

Divide the number of threads you wish to cut by the pitch of the feed screw, and multiply the quotient by the product of the number of teeth on the driving wheels; then any divisor that leaves no remainder to this product is the number of teeth on one of the wheels driven, and the quotient the num- of teeth on the other wheel driven.

Examples.

To cut $9\frac{1}{2}$ threads pitch 4, drivers 40 and 48 teeth.

$\frac{9\cdot5}{4}=2\cdot375\times40\times48=\frac{4560}{38}=120.$ Or,

$\frac{9\cdot5}{4}=2\cdot375\times40\times48-\frac{4560}{60}=76.$

We get 38 and 120, or 60 and 76 for the number of teeth on the two wheels driven.

To cut $10\frac{1}{5}$ threads, pitch 4, drivers 24 and 30 teeth.

$\frac{10\cdot2}{4}=2\cdot55\times24\times30=\frac{1836}{36}=51$, we get 36 and 51 for the number of teeth on the two wheels driven.

To cut 3 threads, pitch 4, drivers 24 and 30 teeth.

$\frac{3}{4}=\cdot75\times24\times30=\frac{540}{20}=27$, we get 20 and 27 for the number of teeth on the two wheels driven.

To cut 10 threads, pitch 6, drivers 24 and 30 teeth.

$\frac{10}{6}=1\cdot66666\times24\times30=\frac{1400}{35}=40$, we get 35 and 40 for the number of teeth on the two wheels driven.

P. GOLAY,
Mechanical and Civil Engineer.

Lima, Ohio, Oct. 17, 1864.

Tumbling of Projectiles.

MESSRS. EDITORS:—In your issue of the 8th, in an article, signed Thomas Taylor, on the tumbling of projectiles, he says Hotchkiss' projectiles can be made to tumble at will by increasing the charge, and that the Hotchkiss shell is broken up by high charges from a very different cause, but the cause he fails to give.

He says the Hotchkiss projectile can be made to tumble at will by using heavy charges of powder. That was the case with large projectiles, on account of lead being too soft. We now harden the lead on our large projectiles, and they cannot be made to tumble with any charge that is safe to put in the gun.

Our projectiles breaking was from the same cause—soft lead. Whenever the lead would not hold on to the grooves of the gun, the shells were drawn apart on leaving the muzzle, and it was supposed they were broken when they were only drawn apart; but since we commenced hardening the lead bands that difficulty is obviated, and they never tumble or break.

We are constantly practicing on projectiles and making improvements, and will guarantee that not one shell in five hundred will tumble when properly loaded in the gun.

HOTCHKISS' SONS.

Bridgeport, Conn., Oct. 24, 1864.

Effect of Hot Water on Tempered Steel.

MESSRS. EDITORS:—I have noticed in your current volume, No. XVI., page 246, "Caution in Boiling Clocks," where you said it would be interesting to have the experiments repeated which your correspondent referred to. I will give you my experience in the matter:—I saw two gun-locks placed (full cocked) in hot water, to clean them, where they were left several days. When taken out I discovered both mainsprings broken, and both in precisely the same place. This led me to try the following experiments:—

I took four bayonet blades with a good spring temper, and sprung them bow-shaped. I then placed two of them in strong hot soda water, and the other two I hung up in the shop where I work. In three days' time three of them were broken. Those in the water both broke on the fifth day, and one of the others broke on the fourth day. The other is not broken yet, it being now nearly eight weeks since it was sprung in that shape. I am satisfied, with these and other experiments which I have tried, that hot water does not affect a piece of spring-tempered steel.

LUKE CHAPMAN.

Collinsville, Conn., Oct. 18, 1864.

The "New" English Steam Engine.

MESSRS. EDITORS:—In your issue of Oct. 29th, under the head of Foreign Intelligence, and entitled "Another New English Steam Engine," I notice the following, viz:—"A new steam engine has been invented by Messrs. Martin & Hodgson, of Manchester, England, which has two pistons in each cylinder on a vibrating shaft, just as a door swings on its hinges," etc., etc.; and then you add, "This engine, or its principle, was designed by Captain Ericsson many years ago," etc.

Now I think the credit of this invention belongs of right to me, as the patent No. 41,091, issued on the 4th of January, 1864, and which you obtained for me, will show. The wording of the claim being as follows:—"The combination of the quadruple induction valves, and the quadruple eduction valves, with the abutments, oscillating pistons, shaft and cylinder, in the manner, etc., to be used either as a steam engine or pump." By giving the above insertion you will do an act of justice, and oblige, etc.,

J. WYATT REID,
Brooklyn Steam Engine and Boiler Works.

[Mr. Reed's engine is doubtless an original conception *with him*, but our statement was correct; the principle of the English engine alluded to was designed by Capt. John Ericsson, and put in operation on the U. S. steamer *Princeton* in 1843. Drawings and full descriptions of these engines may be found on pages 43-51 of *Stuart's Naval and Mail Steamers of the United States.*—EDS.

The Motion of a Bird's wing.

MESSRS. EDITORS:—I noticed in the communication of J. E. Gillespie, in this week's number of the SCIENTIFIC AMERICAN, he states that the "stroke of a bird's wing is always at right angles to the line of elevation," and that "for horizontal flight the front edge would be elevated above the back edge." Now it seems to me that if that is the case the position of the head and tail should be reversed, for the flight would be backward.

Boston, Oct. 17, 1864. F. S. COBURN.

[Mr. Gillespie says that this is the common idea, but it is a mistake; that if the wings were inclined forward the bird, in attempting to fly, would pitch right down to the ground.—EDS.

To Soften Old Putty.

MESSRS. EDITORS:—Herewith I send you a plan to soften old putty. Having tried it several times I know it is effectual. Take a common poker, at a dull red heat, and move it slowly over the old putty, say at the rate of two feet per minute, and you can easily cut it off with a pocket-knife.

H. W. S.

Cincinnati, Ohio, Oct. 24, 1864.

Purity Test of Air.

MESSRS. EDITORS:—While in our densely crowded and often sickening public rooms, I have wished that there were something to indicate the proportion of oxygen in the air, just as the thermometer shows the temperature. It has occurred to me that if a gas-light were allowed to have only a limited supply of air, its brightness would serve as a measure of the share of oxygen.

Will not some of your readers consider this matter and make such a desirable invention. It might be called a "Zoometer"—a measure of the *life* in the air.

D. P. F.

New York, Oct. 14, 1864.

"A Vote of Thanks."

MESSRS. EDITORS:—I received your letter some days since, informing me that a patent was granted me for my improved device for preparing meats for cooking. Please accept my sincere thanks for your kindness and promptness in obtaining the abovs, and for all other favors. I have six or eight more inventions, for which I shall seek to obtain patents through your assistance. I constantly recommend your firm to all I see as the best of friends to and faithful attorneys for all inventors.

GEORGE W. PUTNAM.

Detroit, Mich., Oct. 24, 1864.

Centrifugal Wine Press.

M. A. Rheiler, of Stuttgard, has applied the centrifugal drum, such as been used for expelling water from sugar in sugar refineries, to extracting wine from grapes. The grapes are placed in a drum, the periphery of which is formed of sheet-iron punched full of small holes, and the drum is then caused to rotate 1,000 or 1,200 revolutions per minute. The centrifugal force drives the wine through the holes, while the skins and pulp are retained within. It is stated that the yield of juice by this process is one-seventeenth more than is obtained by the best presses, that the juice is more perfectly separated from the albuminous matters contained in the grape, that the greater absorption of air causes a more rapid fermentation, and that the wine becomes clear and ready to bottle much earlier.

We take these statements from *Le Genie Industriel.* Would it not be worth while to try this apparatus in place of a cider press?

DAY AND MARTIN'S BLACKING.—According to Mr. W. C. Day, the method of making the famous "Day and Martin's" blacking is as follows:—The bone black, in a state of powder, is mixed with sperm oil until the two are thoroughly incorporated. The sugar or treecle is then mixed with a small portion of vinegar and added to the mass. Oil of vitriol is next added, and when all effervescence has ceased, vinegar is poured in, until the mixture is of a proper consistence. This constitutes the liquid blacking of Day and Martin.

IRON SLAG FOR PAVEMENTS.—*Le Moniteur des interets Materiels* says that the waste slag from reducing furnaces is found to be an excellent material for paving streets. It is run into molds so as to form large blocks, and allowed to cool slowly. It has been tried in Paris, and several Belgian establishments have commenced the manufacture of it. One great advantage is that it does not become polished by use.

INSTRUMENT FOR TRANSPLANTING TREES.—M. Douay-Lessens, of Valenciens has invented an apparatus for transplanting trees. *Le Genie Industriel* says that it consists or a cylinder cutting at the base, with two circles arranged to enable the mass of earth about the roots to be removed with the tree. The description is not quite intelligible to us, but this mention may prove a valuable hint to some of our readers.

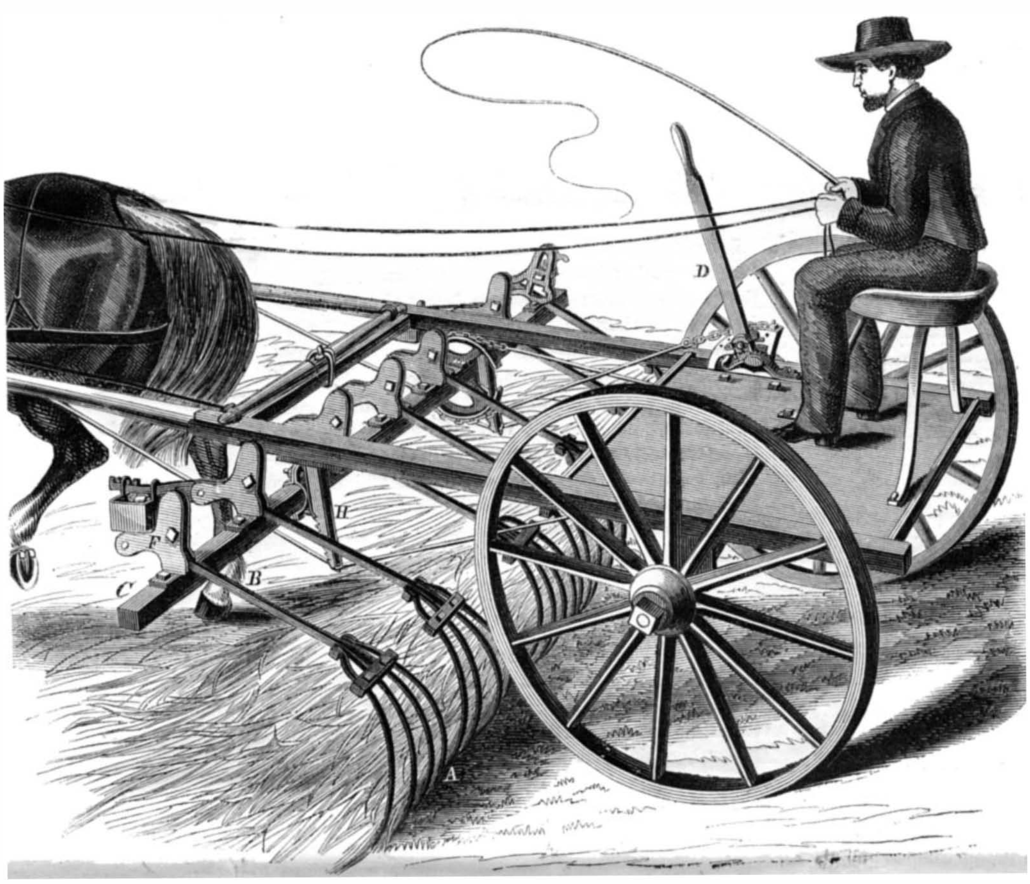
REMOVABLE HORSE-SHOES.—*Le Genie Industriel* says that two horseshoers of Paris, M. Lefevre and M. Guerin, have invented a horse-shoe to be attached temporarily by any traveler whose horse should cast a shoe on the road at a distance from any black smith's shop. It is fitted with straps by which it may be readily secured to the foot. The inventors suggest that it will be found convenient for cavalry on a march.

Improved Horse Hay-Rake.

Farmers are beginning to discover that a good horse rake is indispensable to them, and many are now in use where before they were strenuously opposed. During a recent trip over a portion of the New England States we noticed numbers of mowers, reapers, cultivators, etc., where but a few years since such machines were unused, the farmers saying they might do for the west, but conld never be used to advantage among the rocks and hills of New England.

The rake herewith illustrated is well arranged, easily operated, and strongly made. In its general plan and principle it will, no doubt, be popular with farmers. The rakes, A, are independent of each other, and the handles, B, are all connected to the cross bar, C, so that by shifting the lever, D, they can be raised or lowered in order to discharge the load. The ends of the rake arms are fastened to the bell cranks, F, and the rake arms rise and fall in the slot between the cranks. This is a valuable feature, as it permits any one of the rakes to rise, if obstructions lie in the path,and clear them without breaking the teeth. In going over rolling ground the teeth by their elasticity spring clear of hillocks or other obstructions, and for the same reason the rakes accommodate themselves to the uneven surface. The driver controls the rake from the platform, and beneath this platform there are two screw clamps formed of flat iron bars, having two bolts in each. One of these bars has a lug on it by which it is bolted to the platform. The object of this clamp is to use different sets of wheels, of greater or less diameter, as may be convenient or desirable, and the rake machinery may be purchased independently of the wheels, so that by this additional feature any set of wheels can be quickly put on the machine. The bar, C, which carries the rakes, is also furnished with a sliding rack, H, through which it can be raised or lowered to accommodate the change in the axle. The bar, C, also turns slightly in the bearings, so as to perform its work properly. One man and one horse can easily manage this hay rake.

A patent was procured on this rake through the Scientific American Patent Agency, by David G. Hussey, of Nantucket, Mass., on Oct. 18th, 1864. For further information address the inventor as above.



HUSSEY'S HORSE HAY-RAKE.

THE American File Works, in Pawtucket, have more orders for their machine cut files than they can supply. English steel is mostly used by this company.

Improved Railway Chair.

There have been several serious railway accidents of late caused by misplaced or defective rails. The importance of securing the permanent way, so that it shall be such in reality, is apparent to every thinker. The chair herewith illustrated is strong and easily attached in place. Fig. 1 shows a perspective view, and Fig. 2 a section which will be easily understood. The inventor says:—

"The object of my invention has been to construct a two-part rail chair, having cheeks for supporting the rail head on each side, so that the joint and cap of the rails will at all times remain even and in line. A bolt passing through the end of the rail, from one part of the chair to the other, to secure the cheeks of chair against the side of rail serves also as an additional security against the loosening of the rail. This arrangement for fastening a joint is strong, permanent and cheap, and does not interfere at all with the longitudinal expansion or contraction." The chairs can be made of wrought iron as readily as any chair now in use, but the inventor proposes to cast them and afterword anneal them, which can be done at a small cost. The base of one part of this chair will interlock and break joint with the other part; thus affording a strong and substantial support for the rail at the joint. They can be readily applied to or removed from the rail in case they break, or are adopted on track already down, without moving the sections thereof out of line, or loosening other parts of a rail section for that purpose."

This rail is the invention of Amos Rank, and was patented on 27th Sept., 1864. For further information address the inventor at Salem, Ohio, or Messrs Snyder & Walter, Broadway, N. Y.

Fig. 1

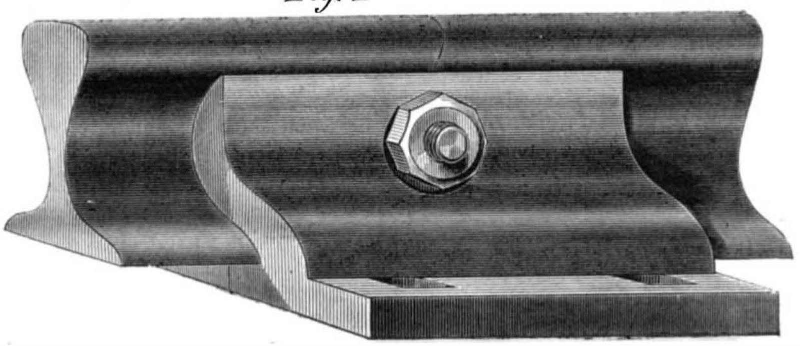
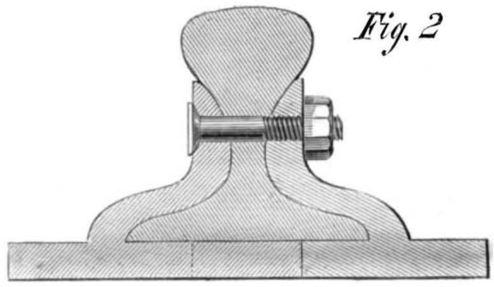


Fig. 2



RANK'S RAILWAY CHAIR.

Overwork.

Unwise above many is the man who considers every hour lost which is not spent in reading, writing or in study, and not more rational is she who thinks every moment of her time lost which does not find her sewing. We once heard a great man advise that a book of some kind be carried in the pocket, to be used in case of an unoccupied moment, such was his practice. He died early and fatuitous. There are women who, after a hard day's work, will sit and sew by candle or gas light until their eyes are almost blinded, or until certain pains about the shoulders come on, which are almost insupportable, and are only driven to bed by physical incapacity to work any longer. The sleep of the overworked, like that of those who do not work at all, is unsatisfying and unrefreshing, and both alike wake up in weariness, sadness and languor, with an inevitable result, both dying prematurely. Let no one work in pain or weariness. When a man is tired he ought to lie down until he is fully rested, when, with renovated strength, the work will be better done, done the sooner, and done with a self-sustained alacrity. The time taken from seven or eight hours' sleep out of each twenty-four, is time not gained, but time much more than lost; we can cheat ourselves but we cannot cheat nature. A certain amount of food is necessary to a healthy body, and if less than that amount be furnished, decay commences the very hour. It is the same with sleep, and any one who persists in allowing himself less than nature requires, will only hasten his arrival at the mad-house or the grave. This is especially true of brain work.

CADET ENGINEERS IN THE NAVY.—The Navy Department has issued regulations under which cadet engineers for the navy may be appointed. The number of the cadets is limited by law to fifty. Each application must be made to the Secretary of the Navy. The candidate must be under eighteen years of age, furnish evidence that he possesses a good character and mechanical aptitude, and that he has been employed two years in the fabrication of steam machinery. Before appointment he must be examined as to mental qualifications and physical fitness. The course of study will comprise two academic years.