

TRUCK.—Wm. P. F. Beggs, Philadelphia, Pa.—This invention relates to a new truck, which is so arranged that its front running gear can be turned short, although its platform is quite low. The invention consists in dividing the truck platform into two parts, of which one forms the main platform, resting upon the rear axle, while the other part is secured upon the fifth wheel, and holds the king-bolt, in the ordinary manner.

THRILL COUPLING.—James P. Collins, Troy, N. Y.—This invention relates to a new and improved mode of securing thrills to axles, whereby a very strong and durable connection is obtained, and one which will admit of the thrills being very readily attached to and detached from the axle, all play and rattle and casual detachment of the thrills avoided.

BALING PRESS.—Jackson Gorham, Bairdstown, Ga.—This invention relates to a new and improved baling press, of that class in which the platin is operated by means of levers arranged on the toggle principle. The invention consists in a modification of the construction of the arms of the levers, and also in a novel manner of attaching the rope of the levers to the operating or driving shaft.

MILL PICK.—Uzzel Stewart, Berlin, Wis.—This invention relates to a new and improved mill pick, of that class which are provided with an adjustable cutter. The invention consists in a novel construction of the pick and the manner of securing the cutter in the stock thereof, whereby the cutter may, with the greatest facility, be adjusted to compensate for wear.

LAMP CHIMNEY.—E. B. Requa, Jersey City, N. J.—This invention consists in a new and improved shape or form of the chimney, whereby the same is kept at an equal distance from the flame all around, and the usual contraction of the chimney above the flame avoided, whereby the chimney is subjected to a uniform degree of heat all around, and the liability to breakage greatly reduced.

CLOTHES WASHING MACHINE.—Eli Hunt, Shelburn, Ind.—This invention relates to a new and improved clothes washing machine, of that class which are provided with a rotary clothes receptacle. The invention consists in placing a rotary clothes receptacle, having a periphery composed of slats and provided internally with lifters; the clothes receptacle being placed within a suitable suds box and arranged in such a manner that the clothes, as the receptacle is rotated, will be passed through the suds, raised or lifted out therefrom, and allowed to drop from the top of the receptacle into the suds, to be again passed through it, which operation effectually cleanses the clothes.

CULTIVATOR.—Jared W. Sanford, Byron, Ill.—This invention relates to a new and improved cultivator, designed for general purposes, so as to be capable of performing all the various kinds of work now done by cultivators. The invention consists in a peculiar construction and arrangement of parts, whereby the end above specified, with a strong, economical and durable implement, is obtained.

MEDICATED BALM COMPOSITION.—L. F. Griffin, New York city.—This invention relates to a new and useful medical composition for curing sprains, bruises, swellings, sore throats, pains in the side and limbs, weakness of the back, ague in the face and breast, rheumatism, gout, neuralgia, and other affections.

GRADING AND EXCAVATING.—T. C. Hammond, Nicolaus, Cal.—This invention relates to an improved grading and excavating machine, and is intended for the grading of road beds for wagons and railroads, and for embankments to be used as dykes or levees for the reclamation of overflowed lands. It is also adapted to the excavation of open cuts for road beds, and to the excavation of canals and ditches for drainage, irrigation, and navigation purposes.

HOISTING DEVICE FOR TRUCKS.—Nathan Albertson, Plainfield, Ind.—This invention relates to a new and useful improvement in a device for raising logs, rocks, or other heavy objects, to be moved on a truck.

ATTACHMENT TO CARRIAGES.—Jackson Gorham, Bairdstown, Ga.—The present invention relates to an attachment to carriages, or more especially buggies, the object of which is to simplify the fastening of the traces and hold-back strap thereto, and the unfastening of the same therefrom, which result is satisfactorily accomplished.

PILL AND OTHER BOXES.—George H. Hawkins, New York city.—This invention has for its object to furnish an improved box for containing pills and other things, which shall be simple in construction, more reliable in use, and manufactured at less expense than the ordinary paper boxes now in use for such purposes.

FLOURING MACHINERY.—Martin Cosgro, Peoria, Ill.—This invention has for its object to improve the construction of flouring machinery so as to take out the fine bran and red particles from the flour while passing through the bolt.

PORTABLE DERRICK.—Chatham B. Wright, Belmont, Ohio.—This invention is designed to improve the construction of portable derricks, intended more particularly for stacking hay, so that they may be more convenient and effective in operation, the derrick revolving automatically to carry the hay over the stack and to return the empty fork to its former position.

ROTARY PUMP.—John Poppe, Greenpoint, N. Y.—This invention has for its object to furnish an improved rotary pump, designed especially for use on shipboard, but equally applicable for use in other places, and which shall be simple in construction, effective in operation, and not liable to get out of order.

SPRING BED BOTTOM.—D. G. Chapin, Galena, Ill.—This invention relates to a spring bed bottom, and consists in the means adopted for fastening the coil to the slats.

LOG WAGONS, CARTS, AND SLEDS.—G. S. Pigott, Central Station, West Va.—This invention relates to an improved log wagon, cart, or sled, and consists in an upright frame arranged on the axletree or roller of a common log wagon or cart or on the cross piece of a sled.

CRANE.—A. L. Batten, Topsham, Vt.—This invention relates to an improved crane especially designed for the purpose of taking sugar pans from the arch. It consists of a gallows crane set in a convenient position in the sugar factory, so that its arm may extend over the pans on the arch, and capable of being swung round to any position desired.

WHEEL.—Julius M. Bailey, Indianapolis, Ind.—This invention relates to an improvement in wheels, and consists in the employment of a wedge-shaped piece of metal keying between the felleys and secured to the tire by a screw bolt, by screwing on which the tire can be tightened on the rim of the wheel; also of a bed or socket wherein the end of the spoke can be stepped and a wedge driven home to tighten the spoke as it gets loose.

TEA KETTLE WITH A SWINGING LID.—C. C. & S. J. Hare, Louisville, Ky.—This invention relates to a new and useful device for attaching a swinging lid to a tea kettle, and consists in connecting the lid to the kettle by a pivot on one side with a curved slot in the lid fitted on the ear of the kettle, so that it shall be held in place by the hall and turn either way horizontally, for the purpose of opening and closing the kettle.

BLEACHING VEGETABLE OILS.—Theodore Leonhard, Paterson, N. J.—This invention relates to a new and improved method of treating linseed and other vegetable oils in the process of bleaching and preparing the same for paint and other purposes.

SAFETY POCKET AND CLASP.—Joseph Colton, New Orleans, La.—This invention relates to a new and useful device for protecting money, watches, and other articles of value from the depredations of pickpockets.

PORTFOLIO FOR NEWSPAPERS, PERIODICALS, MUSIC, ETC.—John C. Clarke, Jersey City, N. J.—This invention has for its object to furnish an improved portfolio, so constructed and arranged that the periodicals, etc., may be easily attached, securely held, and readily removed when desired.

LACING FOR BELTS.—David P. Davis, New York city.—The present invention relates to an improved lacing, more especially intended for machine belts and bands, and the lacing is composed of two parts of similar construction, with each part formed of a cross bar having a series of arms made of a hook shape at their outer ends, so that the parts can be interlocked together, the hooks of one part with the cross bar of the other, and thus if by their arms they are passed through suitable slits or openings made at the proper points in the belt or near its ends, the two ends of the belt will thereby be secured or fastened together, and in such a manner as to bring the strain upon the lacing through the thickness of the belt, in lieu of in the direction of its length and that of the slit through which the arms to the fastener pass

WATER ELEVATOR.—H. Norris, Spencer, N. Y.—The water elevator embraced in the present invention consists of a reservoir placed at the bottom of a well or cistern, but with a space below sufficient for the water to pass into it, connecting with which reservoir is a tube extending up to the top of the well, where it is provided with a suitable discharge nozzle or spout. This reservoir is provided with a loose and movable bottom having in its center a valve plug of sufficient weight to fall through the bottom, which valve plug is provided with a rod or stem extending up through the center tube to its upper end, where through a chain or other line hung to it and passing around a pulley, turning in suitable supports, it is connected to and with a treadle lever.

MUSKETO NETS FOR WINDOW BLINDS.—George W. Miles, Philadelphia, Pa.—This invention relates to an improvement in the arrangement of a musketo net or gauze in connection with a window blind for the purpose of excluding musketoes, flies, and bugs without interfering with ventilation.

MACHINE FOR IRONING OR SMOOTHING CLOTHES, TEXTILE FABRICS, ETC.—C. R. Hoyt, East New York.—In the machine embraced by the present invention the clothes or fabrics to be ironed or smoothed are properly laid upon an endless traveling apron or belt, and by it carried to the ironing roller employed for smoothing the same, which roller is heated in any suitable manner, the frame in which the endless travelling apron is arranged and moves, being so hung that when desired in consequence of the seams in the garments or for any other reason, it can be depressed sufficiently to relieve such portions of the garments from the pressure of the ironing roller, without interfering, with the travel of the endless apron.

WOOL CARDING MACHINE.—S. C. Philbrick, Rockville, Conn.—This invention relates to improvements in the construction of card machinery and consists in applying additional rolls in connection with the first breaker cards and changing the position and run of the clothing in one of the feed rolls, whereby the machinery is rendered much more effective in operation.

ANIMAL EXTERMINATOR.—M. V. Nobles, Elmira, N. Y.—This invention relates to a new and improved method of exterminating the animals or vermin which infest dwellings or buildings, or which prey upon vegetation, or which are in any manner a source of damage or annoyance to housekeepers, farmers, horticulturists, or others.

SASH SUPPORTER AND FASTENER.—James R. Hall, Georgetown, W. Va.—The present invention consists in a simple and novel attachment to sash or window frames for the support and fastening of the sash thereon, at any desired point in its play or movement.

MARINE CLOCK.—A. J. Goodrich, Waterbury, Conn.—The present invention relates to the movement regulator of marine clocks, and it consists in making the same of one piece in lieu of three, as heretofore, the advantages of which are that it is more simple and more durable than the three part regulator; cannot get out of repair unless broken; is easily made, there being no holes to drill, no wire to be straightened and cut, or welding to be done.

EXHAUST FOR MILL STONES.—David Baird, Bloody Run, Pa.—In this invention the hot air, etc., is exhausted from around the mill stones, through a pipe in which a current of air is established by a fan.

MILL STONE DRESS.—A. N. Garland, West Charleston, Vt.—In this invention the furrows are made wide, shallow, and smooth, one edge being cut clear and sharp. Between the furrows, the surface near the center of the stone is smooth, and at other parts of the stone is cut like the face of a file. A new method of bosoming the stone is also used.

SNOW PLOW AND TRACK CLEARER.—Michael J. Cogh, and M. E. Russell, Mobile, Ala.—The object of this invention is to furnish a cheap and effective arrangement for clearing the track of snow and other similar obstructions, which can be attached to any car and adjusted, regulated, and operated by persons on the car.

CHIMNEY.—E. S. Phelps, Jr., Wyand, Ill.—This invention relates to chimneys used in connection with stoves or furnaces, and consists in providing a new support and means of cleaning such chimneys.

CASTING METALLIC PIPES.—Benj. S. Benson, Baltimore, Md.—This invention consists in the use of an anchor of improved form and construction, which does not scratch or wear the mold.

YARD MEASURE.—Joseph Douglass, McConnellstown, Pa.—This yard stick has a handle at one end, and two projecting flanges, which mark the terminations of the measure, which may be a yard, a foot, or other distance, within the reach of the expanded arms.

FLOW.—S. T. Denise, Red Bank, N. J.—In this invention an inverted conical roller, in front of the mold board, and above the plow point, is rotated on its vertical axis by means of a small roller gearing with it, under the plow.

COMPOSITION FOR COVERING WOODEN BUILDINGS, BRIDGES, ETC.—Joseph Heckel, Decatur, Ill.—The composition which is the subject of this invention is designed to render wooden structures fire proof, and to protect them from the action of water and of the weather. It is also designed to be used as a paint, instead of white lead paint.

MILL SET.—T. C. Ball, Bellow Falls, Vt.—In this invention, which is designed for circular saw mills, a table slides back and forth under the head block, having a rail attached to its upper surface, which slides between two pins, projecting downward from the knee. The rail, being inclined at an angle of thirty or forty degrees from the perpendicular to the head block, causes the knees to advance or recede as the table moves in one direction or the other. Several of these tables are connected by a rod, which is operated by a novel reversing arrangement.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at 50 cents a line, under the head of "Business and Personal."

All references to back numbers should be by volume and page.

J. I. of N. Y., asks what will remove nitric acid stains from the hands. Soap and Indian meal bran or pumice stone with rubbing.

J. H., of Mass., replies to the question of S. A. G., of Ind., in No. 22, current volume, how to procure a bright deposit in electro-plating. "A French authority says: Add to the silver bath sulphuret of carbon or an alkaline sulphuret which will cause the silver deposit to be as brilliant as if carefully burnished."

J. M. S., of Ky.—"What is the best recipe for painting a blackboard on a plastered wall?" Lampblack from which the grease has been burned mixed with benzine or turpentine will serve the purpose. Oil or Japan in the paint will give a gloss and make the board too smooth, neither of which is wanted. A blackboard should be of a dull lusterless black.

S. F. G., of Conn.—"What is the average indicated horsepower of the best locomotives, such as are employed on passenger trains; what do they weigh and what amount of water is evaporated per hour?" Passenger engines of about 33 tons weight of good design and in good order have run off from 750 to 800 I. H. P., and will boil off or evaporate about 8,000 lbs of water per hour.

W. W. McM., of Ala., says:—"I want some information in regard to the link motion. What is the rule, if any, to find the throw of the eccentric, the lap of valve over the ports, and the required travel of valve to cut off at any point in the stroke to as short as six inches?" The best plan in order to become practically acquainted with the properties and peculiarities of the link motion is to lay it down, valve and all, full size, on a drawing board. Or, better still, to make pasteboard or wooden models from which may be obtained any measurement desired.

D. W. S., of Robesonia Furnace, says.—"Our hot oven contains 50 pipes through which the blast is forced into the stack. The oven is heated to 600° and the blast is supposed, after passing through the 50 pipes, to leave the oven at the same temperature. Now will doubling the number of pipes without increasing the temperature of the oven increase the heat of the blast after passing through the oven?" If your blast, after passing through the 50 pipes of your oven is heated to 600°, which is also the temperature of the oven, no further elevation of temperature of the air is possible except by increasing that of the oven; hence, if you increase the number of pipes nothing is gained. But we do not think the blast is as hot as the oven; its temperature may be raised by increasing the heating area over which it must pass before entering the furnace.

J. P. J., of Mass.—"Blow holes" in iron castings can be filled with a mixture of lead, 9; antimony, 2; and bismuth, 1. This resembles cast iron in color and expands in cooling.

H. S., of Ohio, asks how mill or other saws can be repaired and asks if silver solder will do. We have seen a large muley saw which was broken soldered with the following composition: Silver, 19 pennyweights; copper, 1; soft brass, 2, melted under a coat of charcoal dust.

O. A. F., of N. Y.—"Will 120 degrees fire test petroleum burn longer than that of 110°? Will an alcohol lamp placed in an air-tight vessel continue to burn until it burns out all the oxygen? How far will a common wooden pump draw water and have the water follow up the sucker (movable valve box), as fast as the lever was forced down measuring from the sucker to the surface of the water?" Oil of a high fire test is heavier than one of a lower grade and will burn longer in a lamp. An alcohol lamp burning in a close receiver will be extinguished before it exhausts all the oxygen. The pressure of the atmosphere at the sea level will raise a column of water about 33 feet; the kind of material in which the column is contained not affecting the result.

J. C. D., of N. H.—"How can I soften ivory to color and press into molds?" In three ounces of nitric acid mixed with fifteen ounces of water put the ivory to soak. In three or four days the ivory will be soft.

W. S. P., of N. Y.—"Can you give me a recipe for coloring gut strings (as those used on a harp) black or red?" We know of no way of dyeing them without injury to the material. Probably a varnish or paint would serve the purpose.

J. H., of Mass., asks how he can deposit gold and procure a rich color without the brassy appearance which he at present obtains. If the plating is on silver and not very thick it will have a light color, as gold when thin is more or less transparent. A deposit of copper before the gold is deposited will give a deeper color; but probably if the gold deposit is thick enough there will be no trouble in producing the proper color without the copper.

C. S., of Minn., asks how he can tin a copper kettle from which the tin has been worn by use. He is so remote from any large place that he cannot get it done. But's "Tinman's Manual" says, "boil the copper vessel with a solution of stannate of potassa mixed with tin borings, or boil with tin filings and caustic alkali or cream of tartar. In a few minutes a layer of pure tin will be firmly attached."

I. V. J., of N. Y.—"Can you give me some idea of the method of generating carbonic acid gas such as is used for so-called soda water, with the proportions of material used and gas obtained?" Carbonic acid for soda water is commonly generated by mixing marble dust with an equal weight of sulphuric acid. Marble contains over 40 per cent of carbonic acid. A cubic foot of carbonic acid weighs two ounces.

Business and Personal.

The charge for insertion under this head is 50 cents a line.

Pattern Letters and Figures for inventors, etc., to put on patterns for castings, are made by Knight Brothers, Seneca Falls, N. Y.

Allen & Needles, 41 South Water street, Philadelphia, Manufacturers of Allen's Patent Lamina, for removing and preventing Scale in steam boilers.

For the Best Shingle Machine in use—will average 70 thousand in 11 hours, with one saw, or 140 thousand with two saws. Address Geo. Challoner, Omro, Wis.

Manufacturers of Auger-twisting Machines will please send circulars to Thos. P. Conard, West Grove, Pa.

All Parties having any article to sell through an agent, address, with circular, etc., Box 499 Oil City, Pa.

Toy Manufacturers will please send their address to Edward Fitzki, Quartermaster General's Office, Washington, D. C.

The Patentee of a new rule wishes to make arrangements for its manufacture. Rule and Scale Manufacturers will address Thomas Carter, 81 Third street, Louisville, Ky.

S. W. Gardiner, Newark, N. J., practical machinist, having a shop of good tools, desires to correspond with those who wish work in his line.

To Iron-pipe makers and Gas Fitters—send price lists of cast-iron socket pipes, dry and wet meters, service pipe, etc., to E. Moody, C. E. Omaha, Nebraska. Quantity required large.

Important to Manufacturers—see advertisement on inside page, of Broughton & Moore's valuable patents and tools for sale. Mr. Broughton has patented all his inventions through this office, therefore we know what his inventions are, and can recommend them as practical.—Eds.

Manufacturers of Circular Saws and Turbine Wheels please send circulars and price lists to Abner Hart, Guysboro', Nova Scotia.

A Young Man desires employment in some situation where a good Scientific and Mathematical education, with a knowledge of drafting, of the principles of mechanism, etc., would be of service. Address A. R., Webster, Me.

H. N. Winans, 11 Wall st., New York, an authority on the subject of Incrustations, proposes to save 10 to 30 per cent of fuel and all the expense of cleaning boilers, by using his Boiler Powder, which removes any sized Scale, and prevents new formations. 12 years' use proves it no humbug.

Inventors and Mechanics interested in the wonderful process of reproducing oil paintings by mechanical means should order our "Journal for Popular Art," the first number of which will be mailed free. Address L. Prang & Co., Boston, Publishers of "Prang's American Chromos."

EXTENSION NOTICES.

A. M. Sawyer, of Athol, Mass., having petitioned for the extension of a patent granted to him the 7th day of March, 1854, for an improvement in machines for splitting rattans, for seven years from the expiration of said patent, which takes place on the 7th day of March, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 17th day of February next.

Warren Gale, of Peekskill, N. Y., having petitioned for the extension of patent granted to them the 7th day of March, 1854, for an improvement in the gage of straw cutters, for seven years from the expiration of said patent which takes place on the 7th day of March, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 17th day February next.

Device for Lathe Carriages.

Various devices have been adopted for the purpose of adjusting the tool of a slide lathe, but they have been all more or less defective, and their use has been in most cases abandoned.

The most popular form still in existence is the weighted rest, but the principle is in this erroneous, as steadiness and stiffness must be sacrificed; for weight is all that can be relied upon for keeping the carriage snugly in position on the bed, and in cases where interstices or irregularities occur in turning, the result is anything but satisfactory. Another point which can be urged against this arrangement is the inordinate wear of the bed occasioned by the necessarily augmented weight. This would not be productive of so much evil were it to extend the full length of the bed, but in tools where short work has been done for even a limited time, a very material hollow is perceivable between the sliding points of the carriage, which is ruinous to the accuracy of the machine. These disadvantages have proved themselves so well founded, that numerous leading manufacturers have entirely relinquished the use of a weighted carriage, and now use merely annular wedges, which certainly cannot be charged with the leading defects of the method just commented upon; but what they gain in this respect they lose in awkwardness of their manipulation, and it is only by a series of trials involving time that the desired adjustment can be attained at all.

Now, the device which our engravings represent, seems to preëminently combine all the most desired features; its solidity is not in the least degree impaired by complete control and fine adjustment of the tool point, even when in operation, and it possesses in itself a novelty, in its adaptedness to cutting screws, of so much merit that this alone is sufficient to recommend it. When cutting screws by means of the ordinary rest, the operator is obliged to draw back the rest when the lathe is reversed, in order that the thread or tool may not be injured. Each time the cut is recommenced the same formula must be observed, which, aside from being inconvenient, is disadvantageous, as the accuracy of the feed is interfered with by the alternating movement of the tool to and from the work. The "Improved Rest" is adjusted to the carriage, A, in the ordinary way, B, is of box form within which is fitted the wedge, E, and block, C, wherein the tool post, D, is inserted. C swings at the point, H, and rests upon the wedge, E, which is in turn controlled by the screw, F. G is a guard to keep the dirt from getting under the wedge. Now, it will be seen that when the elevation of the point of the tool, I, is necessary, a turn of the screw, F, pushes the wedge under, C, and produces the required effect; when depression of the tool point is desired, a withdrawal of the wedge by the same means accomplishes it. When it becomes necessary to reverse the lathe, as in cutting screws, it is obvious that the tool will ride on the work quite lightly, swinging on the pin, H (or it may be relieved by hand to the same end), but immediately on recommencing cutting, the tool will engage solidly, and thus only one movement of the feed is requisite, and that always toward the work between the centers.

This invention was patented by Jonathan E. Burdge, August 13, 1867, and the sole right has been purchased by the Niles Tool Works, of Cincinnati, O., who are prepared to furnish the rests, or furnish tools of their own manufacture, with the patent rest attached.

Improved Spectroscope.

Professor Osborn, of Lafayette College, Easton, Pa., has made improvements in the spectroscope, by which it may be readily applied to a variety of practical purposes, especially in metallurgical operations. In a recent letter to us he says:

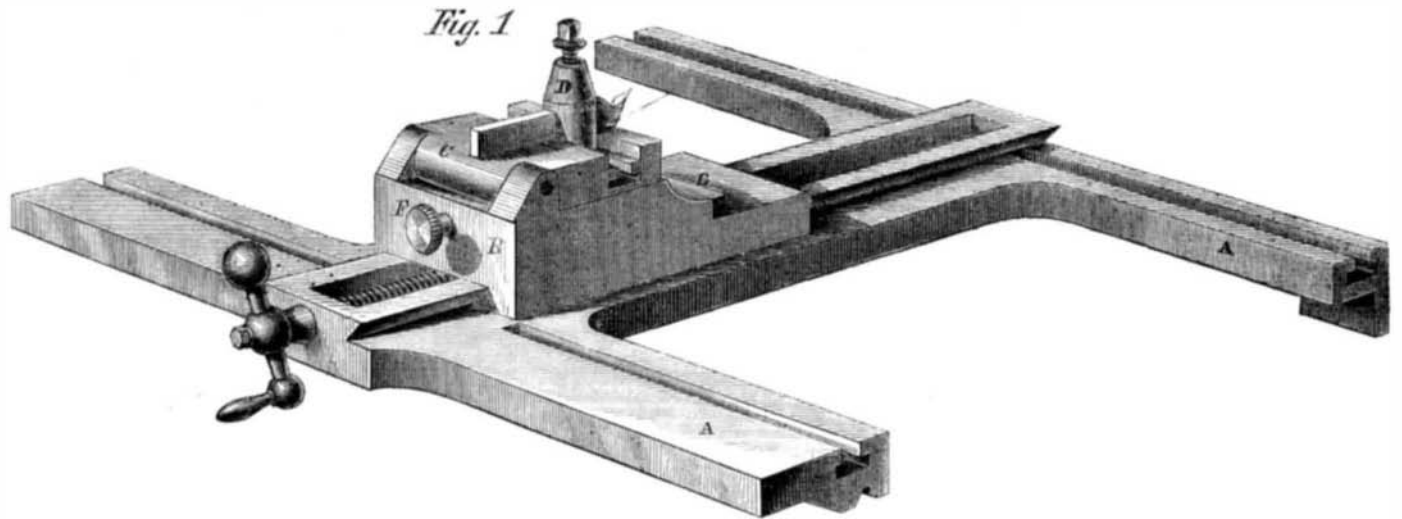
"The instrument complete is so arranged that the observer reads the degree on the scale by the actual light which he is analyzing. The very light which comprises, in its flame, the vaporized metal as lime, iron, chromium, titanium, sodium, etc., discloses to the observer in the spectral form its own nature, not only, but often to a great degree, the approximate quantities found in the original ore or even in the coal used, or from the wasting brick of the furnace. Nothing can exceed the beauty of the spectral forms which suddenly appear and disappear in the otherwise darkened tube, as the observer stands at the 'tunnel head' of the furnace, watching as it were, the spectral secrets of that terrible flame which pours forth from the stack, especially when, after the 'cast' and consequent cessation of the blast, that blast is again turned on.

"The bright yellow bar of sodium is almost always present during examination of all flames resulting from the use of any and all forms of anthracite in the furnace and forge, or from decomposing soda feldspars.

"But one of the most striking facts in my examinations occurred at our last analysis of a flame from a reheating fur-

nace on the Lehigh, at the wire works of Stuart & Co. The workmen held partly out a bar of intensely heated iron on the hearth of the furnace, when, at rapid intervals, the dark lines which are seen in the solar spectrum appeared faintly, but certainly, fitting over the spectrum of the fierce flame by which the intensely heated iron was enveloped.

"An instrument, of a circular form, is in course of construction, under my direction, for the easy examination of these flames, and which may be used at any time and at considerable distances, and I am hoping that such shall be its sensitiveness that the furnace master may sit in his room and know much of the efficiency and value of the operations proceeding at the furnace, by its use. I am situated on a hill, and by means of my instrument, placed upon my dinner

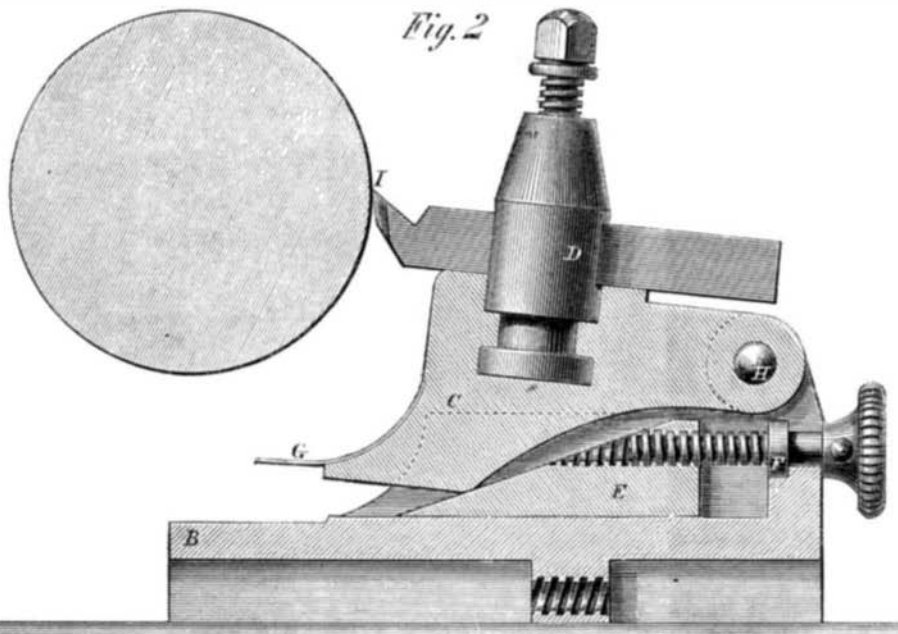


THE BURDGE PATENT IMPROVED TOOL REST.

table, I can get a beautiful spectrum from a reheating furnace situated not much less than a half mile from my instrument, and am able to detect the sodium in the coal, or from the decomposed fire brick, and also any lime, potash, etc., which proceeds from the furnace mouth. I have no doubt that some exceedingly important uses may be made of this discovery of the spectroscope in the line of metallurgical operations."

On the Pressure of Steam at High Temperatures.

Prof. Klingensfeld has lately succeeded in finding a formula for the calculation of the expansive energy of heated water:



as the same is quite simple and short, and the differences between the results obtained by it and the best known experiments are quite insignificant, we hope its publication will not be out of place. It is the following:

$$t = 180 \log. (4 + 6a) + 32.$$

t expresses the temperature, a the number of atmospheres, and log. Briggs' logarithms.

In the following table we have placed the calculation by this formula side by side with the results of M. Regnault's experiments, quoted from the excellent Principles of Physics of Prof. Benjamin Silliman.

PRESSURE. Atmospheres.	TEMPERATURE FAH. OBSERVED. Degrees.	TEMPERATURE. FAH. CALCULATED. Degrees.	DIFFERENCE. Degrees.
1	212	212	0
2	249.5	248.7	+0.8
3	273.3	273.6	-0.3
4	291.2	292.4	-1.2
5	306	307.5	-1.5
6	318.2	320.3	-2.1
7	329.6	332.1	-2.5
8	339.5	348.8	-1.3
9	348.4	349.3	-0.9
10	356.6	357	-0.4

Example.—Required, the temperature to produce a pressure of 67 pounds per square inch (the atmosphere taken at 15 lbs.)

$$t = 180 \log. \left(\frac{154}{5} \right) + 32 \left(\log. \left(4 + \frac{6 \times 67}{15} \right) \right), \text{ being equal to } \log. \left(\frac{154}{5} \right).$$

$$\log. \frac{154}{5} = 1.4885.$$

$$t = (180 \times 1.4885) + 32 = 299.93, \text{ the temperature required.}$$

The National, Anti-Monopoly, Cheap Freight Railway League.

This is the somewhat pretentious title of an association the object of which is, to construct railroads for the use and benefit of the public, with a view to the ultimate adoption of the system on all roads. The idea is, that our railroads, as at present conducted, are doing but a tithe of the work they are calculated for; that the cheap transportation of freight from point of production to point of consumption is a desideratum to all classes; that the proper development of our immense agricultural, mineral, and manufacturing resources demands cheap and rapid means of intercommunication, and that open competition and equal advantages are better than close monopolies.

The intention of the association is to construct several new lines of railroads connecting the South and West with the East, making, in the aggregate, about 4,000 miles of road, exclusive of branches. On these roads trains for freight are to be run—by any individuals or companies who may wish to avail themselves of the privilege by paying a certain toll—at a certain rate of speed, thus keeping the road in continual use. Once established on one independent line, its advantages and benefits would probably insure its adoption on every road in the country.

We have repeatedly referred to this project in favorable terms, but we deem it of too great importance to be allowed to rest. The whole country is interested in this matter. Not unfrequently the cost of transporting articles of prime necessity from their locality of production to the place of consumption is greater than the first value. Every means that can cheapen the price of food, fuel, etc., is eminently worthy attention, and no means is more direct than the diminution in the cost of transportation.

We agree with the *American Railroad Journal*, which says:—

"Few persons, at sight, comprehend the immense effect of an improved system for the rapid and cheap handling of the agricultural, mining, and manufacturing resources of the country. It was stated by an intelligent farmer of the West, a few days since, that the 'Cheap Freight Railway System,' if accomplished, would add three-fourths to the average net profits of agriculture, after deducting the cost of production, to the whole country west of Utica. It has been clearly pointed out that Pennsylvania, in consequence of expensive freights, is suffering under a yearly deficiency of production of more than one hundred millions as compared with some other States, and that Ohio and the West generally, stand in nearly the same category, while the Southern States exhibit a still more meager production. It was well remarked by an experienced railway financier of England, lately, in this country, that 'the great West is starved,' and he concludes that 'cheap freights and very numerous trains are the remedy.'"

As to the feasibility of the plan we have no doubts; the great difficulty will be in convincing railroad corporations and their stockholders that equal rights without monopoly will be in the end more profitable than the present system. Their prejudices, however, would rapidly disappear with the first successful development of the new plan.

FEAT OF A FILE MAKER.—A workman in one of the Sheffield Works has cut a file 19 inches long, 8 inches wide, and 1 inch thick. The file is rough on one side and bastard-cut on the other. The chisel used in cutting it was 12 inches in length so that instead of being over-cut and up-cut in rows one row sufficed for both cuts.

M. PAUL MORIN, the chemist in charge of the Aluminum Bronze Works near Paris, asserts that the melted alloy when poured into the mold is transparent. Mr. T. Sterry Hunt hearing of the assertion witnessed the operation and states that the appearance of the molten stream seemed to corroborate the statement.