Table Knives—Conrad Poppenhusen and C. F. E. Simon, of College Point, N. Y. (assignors to Conrad Poppenhusen aforesaid): We are aware that German-silver knives have been made by fitting the rear end of the German-silver blade to a V-shaped groove in the forward end of the German-silver balance nut, and then uniting them by solder, and we do not wish to be understood as claiming, broadly, the union of the blade with the balance nut by either welding or soldering.

But we claim the mode of procedure described, by which we effect the union of the steel blade with the cast balance nut, whether of malleable or ordinary cast iron by preparing the rear end of the steel blade with cleansed parallel sides fitting a groove with parallel sides in the cast balance nut, preparing the surfaces with borax, or other equivalent flux, and then welding the same by heat and pressure, as described and for the purpose set forth.

RE-ISSUES.

Window Curtain Fixtures—S. S. Putnam, of Boston, Mass. Patented originally April 15, 1851: I claim attaching the curtain to its roll by a piece or strip which fits into a groove in the roll, and is secured thereto by caps at the ends, in the manner substantially as set forth.

Planing Machines—J. A. Woodbury, of Winchester, Mass. Originally patented Feb. 7, 1854: I claim, first, the combination of the rotary disk cutter with the pressers and bed, substantially in the manner and for the purposes described.

Second, I claim the combination of the Bramah wheel, so called, with the rotary disk cutter and its accessories, for the purpose of planing, substantially as set forth.

Third, I claim the method of planing with a continuous drawing cut, substantially as described.

Platform Scales.—Thaddeus Fairbanks, of St. Johnsbury, Vt. Originally patented Jan. 13, 1857: I do not claim a combination of levers, wherein four platform bearing levers radiate from one common center, and are there suspended to a multiplying lever, connected with an equalizing lever, as I am aware that such is a common method of making a platform scale.

Nor do I claim the combination of a multiplying lever, an equalizing lever, and an equalizing and multiplying lever, as I am aware that such have been employed, and the platform thereof upheld by being made to rest directly on the first and last of said levers.

This differs essentially from my combination and arrangement, as by such I am enabled to employ an additional series of levers, viz., the transverse levers, C C C, whereby I gain an extra or manifest increase of leverage, and thus render the apparatus useful for determining the weight of railway carriages.

Nor do I claim the employment of a series of transverse and multiplying levers with a lever composed of a long longitudinal shaft, and an arm arranged transversely and projecting from such shaft, the transverse bearing levers of the platform being applied to the long shaft, with reference to its axis, as described.

But I claim my arrangement and combination of four bearing multiplying levers, C C C C, a multiplying lever, E, and a lever, F, made as described, so as to act at the same time as an equalizing and a multiplying lever, the whole being applied to a steelyard weighing lever by means substantially as set forth.

I also claim, arranging the suspension bridge, so that its arched standards shall extend upwards by the sides of of the platform, and between it and the sides of the pit, in manner as stated, in connection with arranging the transverse levers, C C, and their bearings below the platform, the same affording the necessary room for the vertical play of the longitudinal levers, while it secures an advantage as regards the depth of the pit, as stated.

Furnaces for Burning Wet Fuel—Moses Thompson, of New York City: I do not claim the described arrangement of a series of fire chambers to communicate with one common flue, irrespective of the purpose for which, and the manner which I employ the said arrangement.

But I claim using green bagasse, wet tan, wet saw dust, and other wet carbonacious or vegetable substances as fuel, for the production of intense heat by mingling the gases issuing from a highly heated mass thereof with those arising from carbonaceous combustion by the intervention of a flue or chamber, with which the chamber or chambers containing the fire and charge of wet substances communicate, and in which said gases meet, mingle and consume each other on their way to the apparatus to be heated, and to the stack.

I also claim the combustion, for the purposes of a high degree of heat, o bagasse, refuse tan, saw dust and other wet refuse substances, or very wet and green wood, by the employment of a series of fire chambers arranged in any manner substantially as described to communicate with one common flue or mixing chamber, when any number of said chambers are nearly closed to the admission of air when first charged as described; whilst the remaining chamber or chambers is in full communication with the mixing chamber, and has a proper supply of air admitted, and the ash pit of each chamber in its turn is nearly closed and then opened, and has air admitted whereby the heat required is rendered continuous and comparatively uniform, while the fuel in some of the chambers is being heated and decomposed, and its gases sent forward to the mixing chamber to any desirable degree, as set forth.

ADDITIONAL IMPROVEMENT

Fire Arms—Frederick D. Newbury, of Albany, N. Y., assignor to Richard Varick DeWitt, Jr., of same place. Patented Aug. 12, 1856: I am aware that two or more expanding rings have been used with a loose conical pin, and I do not claim this.

I claim the employment of a permanent cone combined with a ring lying between it and the chamber of the barrel, with a disk fitted upon the ring, the ring being divided on one of its sides by a cut, into which is fitted a pin or wedge, the cone or wedge being so shaped in reference to the ring as to expand it against the charge chamber upon the least re-action of the charge when fired.

DESIGNS.

Legs and Posts of Bedsteads—William Maurer of New York City.

[This new design of a cast metal bedstead is elegant and ornamental, evincing much good taste on the part of Mr. Maurer.]

Priming in Steam Boilers.

Messrs. Editors—The foaming of water in boilers being the cause of much inconvenience, as well as danger, practical experience should be circulated far and wide in order to discover a remedy. Mr. Battell doubtless as signs a correct reason for its occurrence in some cases, but from my own experience I think it sometimes occurs from other causes.

During the summer of 1856 I had charge of the gang saw mill owned by Mr. Thornton, in the undernamed county, which was then driven with a tubular boiler. The feed water was taken from a stream, which was frequently muddy from rain, &c. We were always greatly troubled by foaming when the water was foul, and always stopped it as soon as the water became clear, by blowing off the water and pumping in clean. In my own mill, with a return flue boiler, I have never known the water to foam, though frequently very impure. A. N. R.

Peach Grove, Fairfax co., Va., April, 1857.

[We have known several cases of the very same kind as those described by our correspondent, of foaming being produced by foreign substances, like dirty water, being introduced into boilers. The introduction of indian meal, potatoes, &c., into a boiler, to stop leakage, causes priming in many instances.

Heating by Steam.—The Boiler.

Messrs. Editors—The main edifice of the Ohio Female College is warmed by hot air radiated from steam pipes in chambers, and conducted in flues to the rooms and halls. One flue boiler 18 feet long and 42 inches in diameter is used to generate steam, which is taken from the boiler by two 2 inch pipes, and passed through 20,000 feet of pipe of various sizes, from 1-2 to 3-4 inch diameter, and then it is returned through a 1 1-2 inch pipe into a small receiver, from which it is pumped into the boiler while yet boiling hot, and converted into steam again. The circuit, as nearly as can be estimated, is performed from 10 to 12 times in 15 or 16 hours. The pressure by the gage is from 15 to 20 pounds.

Our flue boiler contains about 18 barrels of water, and the tubular boiler which we are advised to use, contains 10 or 12 barrels.

Please inform me if you know of any practical difficulty in the way of generating the quantity of steam in a tubular boiler necessary to keep up a circulation in the 20,000 feet of pipe, besides working a steam pump, warming water for baths, &c.

Eli Taylor.

College Hall, O., April, 1857.

[We present Mr. T.'s letter almost in full, because it details qnite explicitly one of the methods now in extensive use for heating by steam. There are many opinions on the whole subject, as also on every detail of steam heating. In manufactories driven by steam we are in favor of using large heating pipes—driving *a portion* of the exhaust steam through them. There is no need of compelling all the steam from a large quick-acting engine to blow through the long and narrow passages involved in an efficient system of heating pipes. So long as the p pes are kept filled with steam as fast as it condenses, *and a little faster*, so as to keep up a gentle circulation of pure steam through the whole, unmixed with air, the heating is just as efficient as if the steam were crowded through the pipes at a velocity of some 30 feet per second, to induce which a necessarily great pressure on the exhaust side of the piston must be endured. The quantity induced to flow through the heating pipes may be regnlated by a kind of throttle valve or damper, or by any other means which will partially prevent the escape of the exhaust steam through the direct channel.

Many of the large manufactories in the Eastern States are fitted with a light flap valve covering the exhaust pipe for this purpose. When working, the valve stands always a little open, pulsating with each stroke of the engine, but always serving as a check to the extent of about half a pound per square inch upon the escape of the steam, a pressure which is found amply sufficient to drive the steam through properly arranged pipes.

For buildings where heating alone is wanted we admire a system, now beginning to be quite extensively introduced, in which the boiler is in the basement, and the pipes are large, say 2 inches diameter inside, and wherever it is necessary to carry them along on or under a floor, they are laid inclined about 6 inches in 100 feet. The steam trickles back in these pipes as fast as it condenses, so that no special pipe or feed pump is required to return it to the boiler. In this system, also, the lever of the damper which controls the supply of air to the fire is connected to a flexible diaphragm, which latter is lightly loaded, so that whenever the pressure in the boiler falls too low, the diaphragm sinks and opens the damper, and thus quickens the fire; but whenever, on the other hand, the steam gets above the proper point, the diaphragm rises and shuts off the draft.

This matter of regulating the fire leads us back to the inquiry of our correspondent with regard to the relative merits of a flue boiler for this purpose. The general steam generating efficiency of a boiler depends mainly on the amount of fire surface or heating surface it presents to the water within. Either form is capable of being made equally desirable in this respect, or in other words, one is about as likely as the other to make steam in sufficient quantities, and at a moderate consumption of fuel. If anything, the tubular boiler will be most economical of fuel, other things being equal, but it will also require more calking and repairs, and will not last as long finally, so that the gain in this respect will probably be more than compensated; and unless little room can be spared, or some other peculiar circumstances exist to render the tubular boiler desirable, the plain cylinder or the plain flued boiler will prove most advantageous for general stationary purposes. But there is a special advantage in these latter varieties for ordinary steam heating, and this lies in the greater quantity of water contained. The water and the steam-room in a boiler are the reservoirs—the balance wheels, so to speak, which regulate and equalize the production of steam. The large quantity of water and great steam-room in the long flue boiler treasures up, the heat when the fire is extra intense, and yields it again when the furnace has been freshly fed with fuel. Were it possible to make a good boiler with no water in reserve, and no steam-room in which the elastic fluid might accumulate, the pressure would run down to nearly to nothing the moment the doors of the furnace were opened. This damper and diaphragm for automatically regulating the steam for heating in the system above referred to, works very well so far as we know, because the steam is kept at a very low pressure—about half a pound per square inch—but the devices which we have seen for attempting the same with higher pressures have failed, either from the great strength and stiffness of the diaphragm, or from its cracking and early rupture.

For steam heating, therefore, by all means employ a boiler with much water and much steam room. Protect it well from the escape of heat by radiation, and it will pour out the steam pretty evenly even if the firing be rather badly attended to. A small tubular boiler of equal power is better perhaps for steamboats, and is almost indispensable for locomotives and portable engines, but is not the thing for substantial, stationary work in general, and especially not for steam heating, unless a man can be actively in attendance to feed and regulate the fire almost continually.

Inks.

Messrs. Editors—The complaints of poor ink is now becoming so universal that a remedy must be found. A few years since I bought some blank books from as respectable a house as there was in the United States, and ink from a house of nearly fifty years standing, and equally good reputation, and yet the writing fades, which on record books is a fault which can hardly be over estimated.

After a large amount of examination I am satisfied that the fault is neither in the ink or the blank book manufacturers, but in the *paper*. At the paper mills they use strong chemicals to bleach the rags, and before the pulp is suitably rinsed it is run into paper containing chlorine, oxalic acid, oil of vitriol, &c., in sufficient quantity to spoil any ink ever made. I know this to be so, having often sold oxalic acid for the purpose—a substance which, it is well known, will destroy the color of the salts of iron, a very necessary ingredient in all black inks, and having examined the chemical effect of the paper afterwards.

It is my opinion that a blank book manufacturer who would obtain paper perfectly free from those destroying agents—which can easily be tested by any chemist—would command an amount of trade which would well repay the extra expense. H. A. S.

Hydraulic Cement for Tan Vats.

Messrs. Editors—Your correspondent "J. V., of C. W.," asks what effect will tannin have in water lime, when used to make vats. It will have but little effect if the vats are allowed to remain with nothing but clean water in them until the mortar becomes perfectly hard. Ordinarily the plastering on the inside of the vat will last four or five years, when a new coat may be put on; the mortar in the wall remaining uninjured. I know of one instance where the plastering has remained in good condition for seven years, and bids fair to last as much longer, I speak understandingly in the matter, having built a great many. S. B. E.

Mansfield, Pa., March, 1857.

Sowing Flax Seed.

Messrs. Editors.—In your notice to correspondents in No. 8, Volume 12, Scientific American, you advise "W. G. C., of Pa., to sow two bushels of flax seed per acre.

I am aware that in Europe from 2 to 3 bushels per acre is the quantity generally sown. In the counties of Rensselaer and Washington, N. Y., considerable quantities of flax are sown for the fiber as well as the seed, and from 1 bush. to 1 bush. and 2 lbs. per acre is found to be more profitable than a larger quantity, both as regards the quantity of seed, and quality and quantity of fiber. I am informed by reliable parties that the same holds good in Ohio; however, if your correspondent, F. G. C. intends raising flax, and the business is new to him, it would be well for him to experiment a little; say select an acre and a half, and divide it into three equal parts, and sow, respectively, one-half, three-quarters, and one bushel to each part. The experiment would not cost much, and may save him considerable if he means to make flax-growing a business in future.

Geo. Anderson.

Lansingburgh, N. Y., March, 1857.

[Mr. Anderson is an experienced flax manufacturer, and his advice is worthy of being followed, not only by W. G. S., but others who have cultivated flax. We advised the sowing of two bushels of flax seed to the acre—for fiber—because that was the quantity we had known to be employed with good results in one of the midland counties of New York.

Elastic Horn.

The London *Artisan* describes an invention for softening horn and rendering it elastic like whalebone. The horns are cleaned, split, opened out and flattened, and immersed for several days in a bath composed of five parts of glycerine and one hundred parts of water. They are then placed in a second bath, consisting of three quarts of nitric acid, two quarts of pyroligneous acid, twelve and one-half pounds tannin, five pounds bitartrate of potash, and five pounds sulphate of zinc, with twenty-five gallons of water. After receiving this second bath it will have acquired a suitable degree of flexibility and elasticity to enable it to be used as a substitute for whalebone for certain purposes.

Curves

There are means of mathematically drawing and of rigorously estimating the properties of various curves, which at first seem governed by no laws. There are arcs, elliptical curves, parabolic curves, hyperbolic curves, elastic curves, cycloidal curves, spiral curves, volute curves, catenary curves, and helical curves—each susceptible of being made in an infinite variety of proportions, yet differing from either of the others in fundamental properties. Mathematics is one of the most useful studies for mechanics. It can only be made attractive to some, by showing its application to such tangible subjects as computing forms and strength of materials, etc., and the properties of curves rank among the very highest applications of arithmetical and algebraical powers

The Amount of Air We Breathe.

By a machine constructed for the purpose, Dr. Donni, of Paris, has made a series of experiments to determine the amount of air required for breathing, by human beings. By these he, as stated, has ascertained that the average amount of air required by persons of ordinary form and good health, from the ages of 15 to 35 years, is from 183 to 198 cubic inches per minute; and from the ages of 35 to 60 years, from 122 to 153 inches—the amount being largely exceeded or diminished in exceptional cases.

Double-acting pumps do not discharge as much water by the motion in one direction as in the other, in consequence of one side of the piston or plunger being partially occupied by the piston rod.