

forming a bridge, with a plate, D, to let the lower wheel cross the rail and drop into place. The grooved plate, A, forms a bridge up to the other rail. C is a bar to lead the wheel toward the bridge piece.

Asphaltum, or native bitumen, is largely used for pavements, roads, roofs, and as a waterproof cement. For pavements it is mixed with sand or gravel, and laid while hot upon a foundation of broken stones. The

ASPHALTUM FURNACE,

in Fig. 9, is adapted for heating the material which, when melted, is ladled from the boiler and spread upon the surface to be treated. The construction of the apparatus is quite simple, and will be readily understood from the engraving.

Hints in Hygiene.

From the November number of that most excellent journal the *Herald of Health*, we compile the following practical hints for the preservation of health:

CARBONIC OXIDE

is a colorless and almost inodorous gas, containing one part of oxygen less than carbonic acid. It may be seen burning with a beautiful blue flame on the top of a newly fed coal fire. It is much more poisonous than carbonic acid, and must be guarded against with care. It forms abundantly in our coal stoves, and presses through their cracks and joints into our rooms. It escapes from the gas flame when the pressure is so great that more gas flows than can be burned; it forms and escapes from charcoal burning in the open air or in fireplaces, and may escape into sleeping rooms through open stove pipes or broken flues in chimneys, or half burning wood behind the ceiling, in this way greatly injuring those sleeping therein. Even the ordinary smoke that escapes from smoky stoves and fireplaces may contain it, and persons thus breathing it be injured thereby. One of the effects of carbonic oxide on the blood is that its power to take in oxygen is greatly lessened, and the separation of carbonic acid from the blood retarded.

CANDLE-WICK GAS.

The composition of this smoke is carburetted hydrogen, carbonic oxide, burnt olein, etc. When putting out a candle light before going to bed, always do it so that there shall be no burning wick left to poison the air of the room.

BAKED AIR.

When the air is passed through a hot furnace and heated to a high degree, and then passed into a room, such air should be called baked air, and it is about as bad a form of lung food as can be taken. Nothing but headache, faintness, drowsiness, and dullness can come from its use.

HOW HOUSE AIR IS SPOILED.

The following facts will show how the air in houses becomes contaminated:

1. An adult person consumes 34 grammes of oxygen per hour, a gramme being equal to 15 grains.
2. A stearin candle consumes about one half as much.
3. An adult gives off 40 grammes per hour of carbonic acid. A child of 50 lbs. weight gives off as much as an adult of 100 lbs. weight.
4. A schoolroom filled with children will, if not well ventilated at the beginning of the hour, contain 25 parts in 1,000 of carbonic acid, at the end of the first hour 41, and end of the second hour 81.
5. The air is also spoiled by the perspiration of the body, and by the volatile oils given out through the skin. An adult gives off through the skin in 24 hours from 500 to 800 grammes of water mixed with various excrements, poisonous if breathed.
6. A stearin candle gives off per hour 0.4 cubic feet of carbonic acid, and 0.03 lb. of water.
7. Carbonic oxide is a much more dangerous gas than carbonic acid, and this obtains entrance to our rooms in many ways, through the cracks in stoves and defective stove pipes, or when the carbonic acid of the air comes in contact with a very hot stove and is converted into carbonic oxide. The dust of the air may, on a hot stove, be burnt to produce it; or it may flow out from our gas pipes when the gas is not perfectly consumed.
8. Another form of air injury is the dust of a fungus growth which fills the air in damp and warm places. We call it miasm from a want of a true knowledge of its character.
9. Accidental vapors are the crowning source of air poisoning. These are tobacco smoke, kitchen vapors, wash room vapors, and the like.
10. When we heat our houses and close them from outside air, the heat turns the mixture into a vile mess unfit for breathing. The only remedy is ventilation. Now that it is cold weather and our rooms are closed from free currents of outside air, let us look after the matter thoroughly and do our best to prevent injury to ourselves from polluted air.

CURE FOR LOVE OF LIQUOR.

At a festival at a reformatory institution, recently, a gentleman said, of the cure of the use of intoxicating drinks: "I overcame the appetite by a recipe given to me by old Dr. Hatfield, one of those good old physicians who do not have a percentage from a neighboring druggist. The prescription is simply an orange every morning a half hour before breakfast. 'Take that,' said the doctor, 'and you will neither want liquor nor medicine.' I have done so regularly, and find that liquor has become repulsive. The taste of the orange is in the saliva of my tongue, and it would be as well to mix water and oil as rum with my taste."

SMALL SLEEPING ROOMS.

A large sleeping room is but little better than a small one,

unless there is a supply of fresh air for it, and egress for spoiled air; and on the other hand, a small room where there is a constant change of air is nearly as good as a large one.

The supply of air without draft is more important than the size of the room; still a large sleeping room, well ventilated, is most desirable, and children should never be tucked away in small unventilated rooms.

A DRAFT OF AIR.

When the air moves at the rate of two feet in a second, most people will be sensible of a draft, and if the air is cold it will be felt at a less rapid rate. Now a draft is where a current is felt, and in ventilating our rooms in cold weather the air should move through the rooms so as not to be much more rapid than this. In hot weather it may move more rapidly.

SIZE OF SCHOOL ROOM.

For a school room for 20 pupils, 36 feet square and 12 feet high is about the right size. The entire air of such a room should be warmed and changed five times an hour to keep the carbonic acid down to the proper amount; nothing short of this will keep the air sufficiently sweet. At the end of every hour the room should be flushed from every direction to still further purify it.

COUNTERFEIT GRAHAM FLOUR.

Nearly all the Graham flour sold in New York, and perhaps in other large cities, is bogus. It is made by mixing the coarsest of the bran with either spoiled flour or with white flour which may not be spoiled. This flour is made into bread by bakers and sold to dyspeptics who think it wholesome, but it is a poor substitute for the genuine article. Those who want a genuine article must either make it with a home mill, or have it made to order by an honest miller.

TREATMENT OF SORE THROAT.

In cases of ordinary sore throat, the simplest and best treatment is the wet pack, using a linen cloth wrung from cold water, and over this a knit or crocheted yard band, four feet long and four inches wide. Apply this two or three nights in succession, unless it is a very serious case, when the pack should be kept on during the day. If taken off in the morning, wash the throat in very cold water, and rub dry with a coarse towel and with the hand. This will prevent taking more cold. The more friction used the better; let it be a sort of squeezing of the parts so as to affect the deep-seated tissues. Sore throats may be prevented by these means from becoming chronic.

SCHOOL ROOM DEFORMITIES.

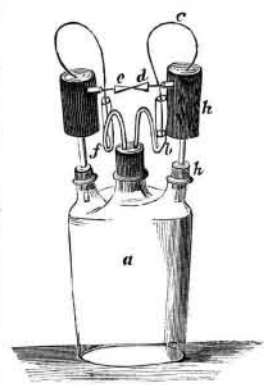
The bodies of growing children are soft and tender, easily made to grow in either a normal or abnormal shape. Now to grow normally requires constant change of position and freedom of limb. It also requires exercise to make the blood flow and load it with fresh air. Now confinement in a school room, unless strict attention is given to air and exercise, prevents their free development and causes deformity. The only remedy is to make physical culture as prominent as mental, a thing not yet done by any means in even the best schools.

PROFESSOR BUNSEN'S NEW APPARATUS AND BATTERY FOR SPARK SPECTRA.

Only for a small number of elements and their compounds is the relatively low temperature of the non-luminous gas flame sufficient to produce spectra which can be of use in analytical researches; by far the larger number turn into vapor at such degrees of temperature as can be obtained only by the electric spark. There are difficulties, however, in the way of employing spark spectra, which consist in, first, the necessity of a simple method by which such spectra can at any time be produced; and second, the absence of spectrum tables useful for all practical purposes.

Professor Bunsen has recently devised means for the overcoming of these drawbacks; and in a very important treatise, the first portion of which, relating to the first requirement above noted, has just been published, he fully describes the results of his investigations. An abstract of the treatise

we find in *Nature*, from which the following facts and the annexed illustration are taken. Professor Bunsen has invented a new battery and a new spark apparatus, by which the spark spectra can at any time be obtained with the same ease and facility as ordinary flame spectra. The battery is a charcoal-zinc battery without clay cells. The exciting liquid is a mixture of bichromate of potash and sulphuric acid. To prepare the liquid, 1.6 lbs. of powdered bichromate are mixed with 0.881 quart of sulphuric acid in a



stone jar, while the mass is constantly stirred; when the salt is changed to sulphate of potash and chromic acid, 9.75 quarts of water are added, the stirring being kept up and the water allowed to flow from a spout about $\frac{1}{2}$ inch wide; the crystal meal, which already is very warm, eventually dissolves completely. The exciters of the liquid are a rod of the densest gas coal, 1.56 inches broad, 5 inches thick, and immersed 4.6 inches into the liquid, and a rolled plate of zinc of the same breadth, of a thickness of 0.19 inch, and immersed to a like depth. The zinc is coated with a layer of wax applied hot, except on the side turned toward the

coal, which is amalgamated. The distance between coal and zinc is optional. The best shape for the cells is that of narrow high cylinders. This battery possesses an electromotive force which is about 13 per cent larger than the ordinary charcoal-zinc or Grove battery. Its essential conduction resistance is about 12 per cent smaller than that of Grove's battery with clay cells.

Four of the pairs above described are used for the production of spark spectra. The pole wires conduct the primary current, of which a branch puts the current interrupter into action, to a Ruhmkorff apparatus, the induction coil of which has a diameter of nearly 7.8 inches and a length of 19.5 inches. The induced current is carried to the spark apparatus represented in the illustration, which is placed in front of the slit of the spectroscopic. The bottle with three necks, *a*, serves merely as a stand. The current passes from the mercury cup, *b*, through the fine wire, *c*, to the carbon point, *d*, which is fastened on a pointed platinum wire; thence, it passes as a spark to the other carbon point, *e*, and from this it reaches the second mercury cup, *f*, which is connected with the other end of the induction coil. The platinum wires, which are surrounded by glass tubes sealed firmly upon them, can be moved upwards or downwards by the corks, *h*, and this allows of a quick and exact fixing of the carbon points before the slit of the spectroscopic.

The method given of preparing the charcoal for the points consists in heating sticks of the coal to an intense white heat in a covered porcelain crucible, contained in a large clay crucible and surrounded on all sides by powdered charcoal. The slides are afterwards cut into cones, and then, in order to eliminate the potash, soda, silica, etc., contained in them, they are boiled in a platinum dish, first with hydrofluoric acid, then with concentrated sulphuric acid, then with concentrated nitric acid, and finally with hydrochloric acid, repeating each process several times, while between each manipulation each of the acids is removed by washing and boiling in water. The carbon cones, after this treatment, weigh about 0.2 grain each, and can absorb more than their own weight of liquid. They give a spark spectrum of very long duration.

Scouring Liquid.

For a considerable time Panama wood and Panama extract have been in great use in France. The following is the recipe given by M. Leclerc for what he calls the *esprit de Panama*, for scouring and removing grease from tissues of all kinds and worn clothes. To take out spots the liquid is used pure, but for general scouring it is mixed with four or five times its own quantity of water.

In 22 gallons of hot water dissolve white Marseilles soap 15½ lbs., and carbonate of potash 1.3 lbs. or 15 or 18 lbs. of soft soap. To the solution add extract of Panama 1.1 lbs.; then in another vessel mix ox or sheep gall 15 quarts, and ammonia at 22°, 8 pints. Heat this mixture, skim it, let it cool, and then add alcohol at 90°, 8.3 gallons; decant and filter.

Take one third part of the soap mixture and two third parts of the gall mixture, and add some aromatic essence.

Method of Increasing the Brilliance and Silkiness of Dyed Goods.

MM. Gillet et Fils, of Belgium, have adopted, and apparently patented, a simple process for this purpose. In addition to the beating by hand or by mechanical power of the dyed silk when in a wet state, they beat it again when dyed and dry, and say that the effect is surprising. They use the same means as in the former case, hand power, the Dashwell machine, beaters, or even fulling mills. The method is said to be equally effective for silk and any other textile material whatever.

New Vehicle for Colors.

A new method of preparing colors for printing on tissues, paper, leather, or any other substance which will take color, is the invention of M. J. P. Daguzan, a Belgian. It consists of a base of natural caoutchouc or, in certain cases, of gutta percha or other gums. The gum is reduced in benzine or other solvent to the consistence of thin paste, and organic colors are added as desired. In practice, down or the shearings of wool or silk, previously dyed of the desired tint, are used, but they may be replaced by any other analogous substances.

Instantaneous Bleaching Fluid.

In 5½ pints of water, heated to 190 or 212° Fah. are introduced successively: Mother of pearl, 3½ ozs.; indigo, 0.75 grain; cochineal, 0.75 grain; chloride of lime, 150 grains; soda crystals, 150 grains; potash, 150 grains. Boil for half an hour, and the preparation is ready for use. The inventor, M. Boisellier, says: "The mother of pearl gives softness, luster, suppleness, etc., and gives to hemp the feel of cashmere; the indigo gives a slight azure tint, the cochineal adds brightness, the chloride effects the bleaching, the soda washes and brushes, and the potash removes all grease."

PROFESSOR F. E. NIPHER suggests the following optical experiment: Observe a white cloud through a plate of red glass with one, and through green glass with the other eye. After some moments transfer both eyes to the red glass, opening and closing each eye alternately. The strengthening of the red color in the eye, fatigued by its complementary green, is very striking.

THOUGH Howe is no more, the Howe Sewing Machine Company is still prospering. A few years ago it established a branch in Scotland, with Glasgow as its headquarters, and it may surprise our readers to learn that in the company's works in the city named 800 persons are employed, and 1,500 machines manufactured weekly.

Freezing Mixtures.

One of the most familiar is the common freezing mixture, which generally consists of equal parts of pounded ice or snow and salt, which produces a reduction of temperature to about -16° C. (3° F.), and is often used for making ice creams, etc. If, instead of the salt, we used three parts of crystallized chloride of calcium at 0° (32° F.), and two parts of snow, we obtain a far more powerful freezing mixture, the temperature falling to about -45° (-49° F.), and quite sufficient to freeze mercury. The salt in the first instance melts the ice, the water thus formed in its turn melts the salt: so we have both the solids changing to the liquid state simultaneously, consequently absorbing a large amount of heat. For a similar reason, the solution of most salts in water is accompanied by the absorption of a large amount of heat; nitrate of potash and chloride of potassium both cool the water in which they are dissolved.

A useful machine is now made for freezing water without the use of ice, which cannot always be obtained, by mixing together powdered sulphate of soda and common hydrochloric acid. The apparatus consists of an upper and lower thin metal chamber, the upper one having two inner casings and an interior revolving inner cylinder, capable of being turned by a handle at the top. The freezing mixture is placed in the inner casing, and the water to be frozen in the outer casing and in the revolving cylinder. Several vanes are fixed on the outside of the cylinder, so that, when it is turned by the handle, the acid and sulphate are kept constantly mixed. After sufficient ice has been made, the water is drawn off into the lower chamber, which is prepared for holding a number of bottles of wine to be cooled by this liquid.

Detection of Arsenic in the Air of Rooms.

H. Fleck has shown in a series of interesting and important experiments that there is arseniuretted hydrogen in the air of rooms, the walls or the carpets of which are colored with Schweinfurth green. The dust of arsenic mechanically diffused in the air is therefore not the only cause of chronic arsenical poisoning. We must add the arseniuretted hydrogen gas evolved from the decomposition of the free arsenious acid existing in the green. The experiments of Fleck prove that this gas is liberated under the joint action of organic matter and moist air, and its presence is therefore possible wherever free arsenious acid comes in contact with organic matter.—*Zeitschrift für Biologie.*

THE angular velocity of clouds is determined by M. Huran de Villeneuve in the following way: He takes a ball of silvered glass, on which he draws with ink an equator and equidistant meridians. He places the sphere so that, the axis being horizontal, the cloud may be seen, by reflection, displaced along the equator traced, and then the time which it takes to go from one meridian to the next gives the angular velocity.

Recent American and Foreign Patents.**NEW WOODWORKING AND HOUSE AND CARRIAGE BUILDING INVENTIONS.****IMPROVED HATCHWAY BRACE.**

James Fleming, Buffalo, N. Y.—This invention consists of adjustable braces which strengthen the sheave timbers, through which the rope attached to the grain shovels pass. The braces also serve to hold the elevator in position, and to protect the shovel ropes against chafing.

IMPROVED HANGER FOR SLIDING DOORS.

Leeds A. Cook, Dansville, N. Y.—This is an improvement on the invention patented to same inventor November 1, 1870. The object is to simplify that device, and the arrangement is so modified as to consist of a sliding door hung to a swinging lever sliding in a slot of the main post, and supported centrally by a radius bar pivoted to said post, so as to be opened and closed by a parallel motion.

IMPROVED SLEIGH.

Benjamin F. Sweet, Fond du Lac, Wis.—The knee of the sleigh is so constructed that it has considerable play or movement in the socket formed by the parts by which it is secured to the runner. The runners are hence adapted to yield somewhat to uneven surfaces, so that the bob will sustain heavy loads, and will glide over the snow with less friction than those whose frame is rigid.

NEW HOUSEHOLD ARTICLES.**IMPROVED WOOD SPLITTER.**

William Latus, Brooklyn, assignor to T. Karutz, Brooklyn, E. D., N. Y.—This is a portable contrivance for splitting wood for lighting fires without damaging the hearth, or using a hatchet. There is a bed piece supporting a horizontal blade, which is caused to reciprocate by means of a handle connected to it by rack and pinion. The wood, being placed between the blade and stationary bed, is quickly split.

IMPROVED CLOTHES DRYER.

Lorin A. Wait, Riceford, Minn.—The arms on which the clothes are hung are attached to a collar which slides on a vertical post. They pass through slots in a revolving cap on top of the post, so that, when the collar is pushed up toward said cap, the arms extend radially, and when the collar is lowered they fold in compactly. By this arrangement, the device can be stowed away in a small space when not in use.

IMPROVED KEY FASTENER.

William W. White, New York city.—This is a useful little invention for travelers, inasmuch as it prevents the key of a door being turned by nippers or other instrument inserted in the keyhole from the outside. A bow of metal in form of a staple hangs on the knob shaft, and passes through the key loop; and its ends are secured in a small block by means of a set screw.

IMPROVED NON-EXPLOSIVE LAMP.

George W. Vernon, Bonsacks, Va.—The invention consists in a wick tube enlarged toward its upper end and provided with a divided neck, to form a channel discharging at the top of the tube. This is applied to a lamp having an oil reservoir below and a water chamber above, the wick tube passing down through the latter to the former. By this construction, the wick tube is kept cool while, in case of an overturn, the flame is instantly extinguished.

IMPROVED BEEF STEAK TENDERER.

Theophilus Billington, Weatherford, Tex.—This inventor proposes to pass the steak through studded rollers, mounted one above another on a stand. Said rollers may be adjusted for different thicknesses of meat, and may be pressed together by power easily regulated by the operator.

NEW AGRICULTURAL INVENTIONS.**IMPROVED GRAIN SEPARATOR.**

Hermann Mielke, Watertown, Wis.—This machine is so constructed that the current created by the fan acts on the grain in its passage from the hopper, and separates the light grain from the heavier. The lighter falls on a laterally inclined plane, between partitions, and is conveyed to the side of the mill, the chaff and other impurities being conveyed over an outer inclined plane, extending downward from the second partition wall. The machine may be worked for any kind of grain by a simple regulation of the feed opening and current.

IMPROVED HARVESTER.

Christopher Lidren, La Fayette, Ind., assignor to himself and R. Jackson, of same place.—In this invention, the novel features include a rake pivoted to the rake standard to swing backward and forward to discharge the gavels, together with devices which turn the rake or scraper up edgewise preparatory to going back to scrape off the gavel, and turn it down flatwise preparatory to going forward again. Arrangements are provided to pass the scraper forward below the platform and up through it and the grain which falls while a gavel is being discharged. There is also a means of returning the rake to the front without interfering with the grain lying on the platform, and a novel mode of supporting and adjusting levers for the reel, whereby it can be readily raised and lowered by the driver without moving from his seat, and without altering the tension of the belt.

IMPROVED MOWING MACHINE.

David Wolf, Avon, Pa.—This inventor proposes ingenious mechanism for locking the cutter bar of a reaper or mower in different positions to adapt it for various kinds of work, and to enable it to be fastened upright for passing from place to place.

NEW CHEMICAL AND MISCELLANEOUS INVENTIONS.**IMPROVED SAFETY OIL RESERVOIR.**

Thomas Scantlin, Evansville, Ind.—This consists of a can or reservoir provided with a pump and with measuring compartments and a filling compartment and tube. The measuring vessels may be of different size, so as to hold the quantities usually called for, as one quart, two quarts, or a gallon. The oil is drawn, as it may be ordered, directly into the customers' vessels, and is not exposed to the air, or to danger from fire.

IMPROVED VARIABLE MEASURE.

Charles P. Sullivan, Jr., Line Creek, S. C.—This inventor has devised an ingenious method of combining several measuring vessels in one. The box has a movable bottom which is shifted up or down in the interior and sustained by pivoted pieces from below, and by pins inserted through perforated hollow vertical tubes on the sides.

IMPROVED BUTTON FASTENING

James H. Harrington, Providence, R. I.—This is a new way of fastening buttons to garments so that they may be attached or detached without sewing. The button has a spring hook eye pivoted its back in which is inserted a ring.

IMPROVED MEDICAL COMPOUND.

John W. Harvey, Memphis, Mo.—This invention relates to a new medical compound for the cure of catarrh. It is composed of nitrate of potash, chlorate of potash, powdered golden seal, table salt, and gum camphor, to be dissolved in water and used as a bath to the head and nose, or snuffed up the nose and inhaled in the form of a powder.

NEW MECHANICAL AND ENGINEERING INVENTIONS.**IMPROVED COMPRESSION COCK.**

James McLaughlin, New York city.—This compression cock is so constructed that it may be fully opened and closed by a half turn of the handle. The inventor states that it is entirely free from leakage, durable when used with both hot and cold water, and not liable to get out of order.

IMPROVED LUBRICATOR.

Joseph Warren Reed, Kalamazoo, Mich.—This is a hollow plug charged from the holder and discharged into the engine, at the same time cutting off the supply from the holder. The new features include, first, an improved contrivance of venting the hollow plug, by which there is no waste; second, of a valve to shut off steam from the holder to prevent the mixing of water with the oil by the condensation of steam; third, of a ventor wastepipe connecting with the space above the valve, to carry off the condensed steam in case the valve is not perfectly tight, and insure its closing; and, fourth, of a contrivance to regulate the amount of oil delivered.

IMPROVED ROAD ENGINE.

John Henry Bange, Edwardsville, Ill.—This is a new and ingenious form of road engine, to which the name of the "Mountain Runner" has been given by its inventor. Many of the improvements are of a mechanical nature and cannot be clearly described without the aid of drawings. The principal feature, however, consists in the novel construction by which the water in each compartment, when the engine is passing up and down hill, finds its level independent of the water in the other compartments of the boiler, so that it cannot collect at the end of the boiler, but will be distributed through it.

IMPROVED DEVICE FOR TRANSMITTING POWER.

John Wesley Woodruff, Jollytown, Pa.—This invention consists of the connection of a fly wheel by a long crank lever, of which one end is fixed to a point near the circumference of the fly wheel, while the other crank-shaped end turns a large spur wheel that intermeshes with a pinion of a shorter shaft with a transmitting pulley. The transmitting lever turns by a ball journal in socket bearings near the crank end. This enables the power of an engine to be transmitted for some distance and then applied directly to machinery.

IMPROVED CAR WHEEL CHILL.

William Wilmington, Toledo, Ohio.—This invention relates to certain improvements in chills for casting car wheels, and it consists in constructing the metallic annular chill with annular air chambers at the points of the interior surface of the chill where the outer periphery of the flange of the wheel is formed, and also at the points where the outer horizontal surface of the tread is formed, by means of which the central portion of the tread which receives the greatest wear is allowed to harden: but the outer periphery of the flange and the outer surface of the tread are prevented from rapid cooling by the new conducting air chamber, and the metal at these points is molded and preserved in its full strength and tenacity, a result to be greatly desired in view of the fact that, while the process of chilling hardens the iron, it greatly impairs its tenacity and strength.

IMPROVED ELEVATED RAILWAY.

John Westcott, Tocol, Fla.—The object of this invention is to provide a cheaper construction of railroads and cars than that now in use, and it consists in a single iron rail laid upon and fastened to a continuous beam of wood, which is supported upon the ends of a series of piles driven into the earth so as to constitute an elevated railway. The cars have a single set of wheels, which have two flanges and run upon the rail, the bottom of the car being close to the rail, and the sides of the same extending down by the sides of the piles and engaging with friction rollers upon the same to steady and hold the car in position.

IMPROVED CAR COUPLING.

Hugh F. McKervey, Cheboygan, Mich.—This invention is an improvement in car couplings of the harpoon variety, and it relates, first, to the combination and arrangement whereby the coupling bar is connected with a pivoted counterweight, and by it maintained in such position that lateral arms or shoulders formed on its middle portion will remain engaged with hooks or shoulders formed on the front end of the same drawhead which contains the counterweight. The invention consists, secondly, in the arrangement of a sliding bar in such relation to the counterweight, pivoted within the chamber of the drawhead, that the latter may be thereby raised, or turned on its pivots, and locked, or held in its elevated position by the slide bar projection under it.

IMPROVED DRIVE-WELL PACKING.

Vincent F. Thomacich, Mobile, Ala.—This invention relates to the packing of the drive well or other pumps, and contemplates a prevention of the curling of the hard leather packing. It consists in a metallic ring support, concaved on the inside and bracing the leather packing of the piston.

IMPROVED SPINDLE BOLSTER.

Welcome Jenckes, Manchester, N. H.—This invention relates to what is known as the spindle bolster of spinning frames, and consists of a longitudinal slot in the bolster, in which slot is placed a packing, which is saturated with oil for lubricating the spindle. By this arrangement, the spindle is kept lubricated for weeks continuously, and the trouble of oiling every day, as is usually the case, is obviated.

IMPROVED COTTON PRESS.

Benjamin F. Platt, Vienna, La.—This is a very simple and inexpensive plan for applying hand or horse power to work the press. The press case is arranged on stationary pivots. Each pivot is screw-threaded, and has for its head one of the press followers. The screws are right and left handed, so that they move the followers in opposite directions at the same time, when the power is suitably applied.

IMPROVED LIFTING JACK.

Samuel E. Mosher, Chillicothe, Ohio.—In this device the lifting bar has downwardly-inclined teeth on one side in which teeth on the lifting dog engage. The dog is pivoted to a lever, which in turn is pivoted to swinging bars on top of the stand, so that the dog is drawn into the teeth on the bar when force is applied to the lever.

IMPROVED ADJUSTING FEED ROLLS FOR PLANING MACHINES.

Charles D. Lawrence and Charles E. Ward, Fairfield, Me.—The feed rolls are mounted on a rod by bearings which can slide or be fixed in position as may be preferred. The bearings are moved by a shaft having pinions gearing with station racks. An arm connecting the lower sliding bearing turns it to shift a pinion along the feed roll to keep it in gear.

IMPROVED ADJUSTABLE BUMPER OR FENDER PLATE FOR PILES OF ELEVATED RAILWAYS.

John Westcott, Tocol, Fla.—The object of this invention is to provide a bumper or fender plate for protecting the piles of elevated railways, in which the track consists of a single rail mounted upon a series of piles, and the car is provided with pendent extensions upon each side of the rail which extend down beside the piles. The invention consists in two symmetrically shaped curved plates faced upon the inside with elastic cushions and provided with flanges which are fastened together by means of screw bolts, so as to cause the said plates to tightly clamp the piles, and having lugs to keep them from turning.

NEW BOOKS AND PUBLICATIONS.

THE HUMAN VOICE, ITS ANATOMY, PHYSIOLOGY, PATHOLOGY, THERAPEUTICS, AND TRAINING. By R. T. Trall, M.D., Principal of the Hygieo-Therapeutic College, etc. New York city: S. R. Wells & Co., 737 Broadway.

This work is intended to be a manual for the use of students of elocution, and to it are appended rules for the management of debating societies, and some selections from popular authors for practice in reading aloud with correct and appropriate expression.

MANUAL FOR THE USE OF THE GLOBES. Illustrated. By Joseph Schedler. New York city: E. Steiger, 22 and 24 Frankfort street.

This is a very readable little pamphlet, containing some excellent remarks on the value and importance of the science of geography. The astronomical information is very concisely and well expressed.

HANDBOOK FOR CHARCOAL BURNERS. By G. Svedlius. Translated from the Swedish by R. B. Anderson, A.M. Edited, with notes, by W. J. L. Nicodemus, A.M., C.E. Illustrated. Price \$1.50. New York: John Wiley & Son, 15 Astor Place.

This little manual was originally prepared for the Government of Sweden, chiefly from two meritorious but unsuccessful papers offered in response to an official call for a popular treatise on charcoal burning. It no doubt fairly represents the best practice of Sweden in the matter of charcoal making, and may be found useful to those engaged in pit burning on a small scale. Professor Nicodemus has added a few notes from Percy's "Metallurgy," and from Crookes & Röhrlig's treatise on "Fuel," the latter describing briefly some of the older methods of kiln-burning practised in this country. To answer for American charcoal makers, this portion of the work would need to be very much extended.

A TREATISE ON THE RICHARDS STEAM ENGINE INDICATOR, and the Development and Application of Force in the Steam Engine. By Charles T. Porter. New York city: D. Van Nostrand, 23 Murray and 27 Warren streets.

This work is written in a clear, lucid style, showing its author to be a thorough master of his subject. The reader is led, from a clear understanding of the requirements of an indicator and the manner in which the well known Richards indicator fulfils them, to carefully written instructions, first as to how to use the instrument, and then how to compute the results of any given diagram. The laws governing the development and application of force in a steam engine are laid down in a concise manner, giving a complete understanding of their principles. The book contains many excellent and carefully compiled tables, showing an immense amount of work by the author, and will be found useful to the professional engineer as well as the student.

Inventions Patented in England by Americans.
(Compiled from the Commissioners of Patents' Journal.)

From October 8 to October 12, 1875, inclusive.

CONDENSER.—Ransome Siphon Condenser Co., Buffalo, N. Y.
DOUBLING MACHINE, ETC.—J. F. Wicks, Providence, R. I.
EXCAVATING MACHINE.—P. J. Stryker, New Brunswick, N. J.
LIGHTING GAS, ETC.—M. E. Jones, Pittsfield, Mass.
STILT.—F. Beaumont, Jr., et al., Dallas, Texas.