

or gravel stones, and duly combined with coal tar or asphaltum, and his opinion of it?

It seems to me that roads are of importance equal to any material interest of our great country, and should share the attention of the press, and of able men, to a greater extent.

All you have done, or can hereafter do, to aid such enterprises, will have the gratitude of at least one of your numerous readers. PATHMASTER.

SPEED OF RAILWAY TRAINS.

A correspondent writes upon the subject of higher speed for railway trains in the United States. His opinion seems to be that the present rates of speed are generally too low to meet the wants of the public; that much higher rates are already talked of, and will shortly be demanded; while he also thinks the machinery of locomotives, and the structure of the rolling stock, too slight to endure an increase of speed with safety.

While it is undoubtedly true that a demand for greater average speed exists on the part of the traveling public, and also that the speed of American trains is generally much lower than the standard of English roads, our correspondent errs in supposing that this is owing to any inferiority in the structure of American locomotives or quality of the rolling stock. Both the locomotives and passenger cars of American manufacture are equal in strength, elegance, and efficiency to any made in the world. Indeed, it may reasonably be doubted whether our passenger cars are equaled by those made in any other country. Our roadways are, however, very inferior to those of England and France, and, until this fault is remedied, the present rates of speed can never be greatly increased with safety.

Foreign railroads are superior to ours in the following respects: First, the roadways are much more firmly constructed at the outset, and are less likely to be injured by frost. Second, there are fewer intersections of railways with each other and with common roads than is the case with us, the practice of undermining being pre-erred. Third, the lines are kept under a more strict surveillance; they are better fenced, barred and watched than the majority of American roads. Fourth, their bridges are, in general, much more substantial and permanent structures than ours.

These are the reasons why a higher rate of speed is compatible with safety on English roads than is possible with us. Still when grave doubts exist in England whether the rates of speed now maintained on her roads are not too high, and when such men as George Augustus Sala take up the pen to advocate their reduction, sustaining their position, by considerations both of public safety, and comfort, and profit to the companies themselves, it may well be doubted whether upon the inferior railways of the United States a much higher rate is either practicable or desirable. That our railroads cannot be improved so as to approximate in stability the English railways, we do not of course assert. That a speed, under any circumstances, of over from thirty to thirty-five miles per hour, should be made the standard for fast trains we think unreasonable to expect or to demand.

Editorial Summary.

THE oldest house in the United States is believed by some to be a stone edifice in Guilford, Conn. It was built in 1640 the stone being brought on hand-barrows from a ledge at some distance from the site of the building. The cement with which the walls were laid up is said to be harder than the stone itself. The first wedding in Guilford took place in this edifice, the supper provided being pork and peas.

If storms cannot be predicted, their progress can be communicated, so that preparation can be made for their approach. The latest proposal is to telegraph to various stations throughout the country the state of the weather, and announce it to the agricultural population by pre-arranged signals, of the discharge of cannon.

CAPITAL OF RAILWAYS.—During the forty-one years which have passed since Stephenson ran his first train on the Stockton and Darlington line, the railways of Great Britain absorbed £500,000,000 of capital, and extended over more than 14,000 miles. In 1865, the length of lines was 13,289 miles, of which more than a third were single lines, and the rest double; this was an increase of 500 miles over the preceding year.

A STEAMER is building in Boston designed to transport molasses from the West Indies. She is to be built in compartments, so as to bring the molasses in bulk, instead of hogsheads as is now the custom, and will have a carrying capacity of eight hundred hogsheads. It is estimated that this method will make a very large saving in the transportation of this article, and if it proves successful, will be generally introduced.

AN avalanche of rocks recently occurred near the Watch House, on Mt. Mansfield, Vt. One huge rock, of a hundred tons weight, moved its way through the dense timber for a thousand feet, and only stopped within ten feet of the house. Other enormous fragments rushed through the timber in various directions, their force being shown by the large number of shattered and prostrate forest trees.

A SINGULAR eclipse of the sun will take place on the fifth of November. This is no less than an eclipse of the great luminary by the planet Mercury, of course it will be invisible except to eyes armed by telescopes, and to these only in favored localities of which Paris is one. That city will how-

ever have to forego the sensation of the great solar eclipse of 1869, while it be visible in many parts of the United States.

A STATUE of the celebrated Hans Sachs, bootmaker and poet, is about to be erected at Nuremberg. In order to secure the funds necessary, for the inauguration a lottery is organizing under the direction of the boot and shoe makers of that city, in which all the prizes are to consist of foot gear.

NEWS from Spain is now received at Paris by means of carrier pigeons, telegraphic communication having been interrupted.

WE notice that the cultivation of silk is attracting increased attention in Southern California. This is right; there are no natural conditions wanting to make California as thrifty a silk growing district as exists upon the face of the earth.

THE Zouave Jacob, who made such a stir some time since by his mesmeric healing in Paris, has been called to Berlin by the King of Prussia to treat one of the royal family.

THE largest manufactory of shoe pegs in the United States is said to be at Burlington, Vt. It every day transforms 4 cords of wood into 400 bushels of shoe pegs.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

THE PACIFIC RAILROAD EXTENSION.—The Vice President of the Union Pacific Railroad has written a letter to the President of the United States, in which he says:—"The Union Pacific Railroad Company has been informed of the appointment of a special commission to re-examine their road. If this commission includes all roads receiving similar subsidies and bonds, this company will regard the appointment with satisfaction, but if no other road is included, it becomes evident that the Government has listened to representations unfavorable to the character of our work, and which justice requires that I should contradict. I think it my duty, therefore, to assure your Excellency that the Union Pacific Railroad is at least equal to any of these other lines in construction, appointments, and permanent improvements, and that you can easily ascertain the thoroughness and excellence of the work by reference to Generals Grant, Sherman, and Sheridan, who have lately been over the line, and from many other eminent practical railroad men. I respectfully request that the commission be instructed to include all these roads in the examination, and to report in detail the comparative qualities of each."

THE NEW POSTAGE STAMPS.—The Postmaster General has just awarded the contract for the supply of stamps to the department for the ensuing four years to the National Bank Note Company of New York. The new stamps will be somewhat smaller than those in use at present, but they are of a superior style and finish, with a novelty in design. The two-cent stamp contains an engraving of a postboy on horseback in full speed. The three-cent has a locomotive under full head of steam, the great carrier of our domestic service. The five-cent stamp contains a head of Washington. The ten-cent, the most of all in design and execution, has a miniature engraving of the Declaration of Independence, executed with such delicacy and precision that the picture suffers nothing under an magnifying glass. The twelve-cent stamp has an ocean steamship, and the thirty-cent has a finely executed engraving of the surrender of Burgoyne. When it is considered that over a million stamps are issued daily the importance of this contract is at once evident.

Mr. Jason Clapp, a well known carriage manufacturer at Pittsfield, Mass., died at his residence on the 19th inst., at the age of 85 years. Carriages of his make have been sent to Germany, one to the King of the Sandwich Islands; and the very beautiful one, presented to President Pierce, while in the Presidential chair, by the citizens of New York was built by him.

The cannon foundry of Krupp, in Essen, Prussia, extends over 920 acres, 246 of which are occupied with buildings. It has 12 miles of railroad, 6 locomotives, 150 wagons, and 50 horses. There are 9,000 jets of gas, consuming about five millions of cubic feet per day; 10,000 men are employed in the foundry; 1,200 at the mines and forges. The wages amount to 3,100,000 thalers per annum. The motive power consists of 160 engines of 6,000-horse power each. The daily consumption is 13,000 bushels of coal, 32,500 bushels of coke and coal, and 200,000 cubic feet of water.

A hydrographic survey of Vermont is talked of. The highest point on the Pacific Railroad is 8,362 feet above the sea. The rolling mills of Philadelphia pay annually for wages the sum of \$1,000,000.

The only glassworks in Indiana are situated at New Albany where larger quantities of bottles are made.

A single firm in Philadelphia employs in the manufacture of gas fixtures 750 hands. Another employs 400 hands.

The extension of the Horicon branch of the Milwaukee and St. Paul Railroad has been formally opened at Winneconne.

It is stated that the reduction in prices of freight over the three trunk lines to the West is the result of general understanding, and is intended to run off the various fast freight lines.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

CONDENSER.—Wm. L. Winans, England, and Thomas Winans, Baltimore, Md.—This invention relates to surface condensers of steam engines and consists in the means for preventing the surface of the condenser and the valves of the air pumps in surface condensing engines from being charged, coated, clogged, or obstructed with grease, tallow, or other extraneous matters which may be carried over with the steam from the cylinder into the condenser.

OPERATING WINDOW BLINDS.—Levi W. Swafford, Edward Butler, and John R. Hess, Muscatine, Iowa.—This invention relates to a new and improved method of operating window blinds, whereby the same are opened and shut and the movable slats of the same are adjusted, and blinds are more securely fastened without the necessity of raising the window for that purpose.

HORSE POWER HAY ELEVATOR.—Amos B. Hunt, Matteson, Mich.—The object of this invention is to provide the means of elevating hay from the wagon and storing the same in the bay or mow of a barn (or lifting hay from the stack and loading the same on a wagon) in a rapid and easy manner with the aid of only two attendants and a horse or other draft animal. It consists in general terms of a swinging crane or sweep bar provided with a lifting rope, pulleys, and catch and tripping devices, together with other devices perfecting the whole.

ROTARY STEAM ENGINE.—Levi F. Goben, Spring Hill, Mo.—This invention relates to certain improvements in rotary engines.

PAPER CUTTING MACHINE.—Hervey Law, Cnatham, N. J.—This invention relates to a new and improved machine for cutting paper, and is more especially designed for the use of book binders.

BEEHIVE PROTECTOR.—Alfred S. Johnson, Naupun, Wis.—This invention relates to a simple and economical device for protecting beehives from the cold of winter and the heat of summer.

CHIMNEY CLEANER.—Michael J. Lourentz, Leavenworth, Kansas.—This invention relates to a new and simple method of cleaning the chimneys of lamps, and it consists in combining two wires or rods with buttons or heads thereon.

PROCESS OF, AND COMPOSITION FOR TANNING LEATHER.—G. Z. Dpe, New York city.—This invention relates to a new tanning composition, which is so compounded that the leather can be completely tanned in a few days, while heretofore it took months to do it.

STEAM BOILER.—R. W. Humphreys, Clarksville, Tenn.—This invention consists in forming a steam boiler of an annular ring or tube in which are placed tubes or flues for the passage of the products of combustion, and in attaching to the same a fire-box or furnace and a smoke stack.

SUGAR-PAN DERRICK.—J. D. Ayers, East Greensboro, Vt.—The object of this invention is to provide a simple and effective derrick for lifting sugar pans off and on the furnace arches. It consists in the combination of lifting pulleys with a pan frame, which is arranged to slide on a horizontal arm which is raised and lowered by the pulleys, the said arm forming a movable attachment to a rotary upright.

WROUGHT IRON AND STEEL COLUMNS.—George Walters and Thomas Shaffer, Phoenixville, Pa.—This invention has for its object to furnish an improved column, which may be made of wrought iron or steel, which shall be firm, rigid, strong, and neat in construction, adapting it for use in those parts of a building or structure where neatness of appearance, combined with strength, is required.

CORN PLANTER.—C. W. Thiessen, Effingham, Ill.—This invention relates to a new corn planter, which is so arranged that the wheels contain the seed box and the dropping apparatus, whereby a very secure and regular distribution of the seed is obtained. The invention consists in such an arrangement of adjustable slides, that work on the face of the wheel, in boxes projecting from the face of the wheel, and in such a combination of the same with a seed box secured to the inner of the wheel, that the requisite quantity of seed is dropped during each full, half, or other partial revolution of each wheel, and that each seed is, by such revolution of the wheel, not only dropped, but also securely imbedded in the soil.

REAPING MACHINE.—Miletus J. Wine, Long Glade, Va.—The object of this invention is to provide a simple and more efficient means for removing and depositing the gavel.

COMBINED VISE AND ANVIL FOR CIRCULAR SAWS.—David Huffman, Luray, Va.—This invention consists of an anvil and a vise combined, in a neat and portable shape for the purpose of treating saw teeth.

GATE FOR SCUTTLING SHIPS.—John Hail Marshfield, Mass.—The object of this invention is to construct and attach to vessels a gate which can readily be opened for the purpose of scuttling them, and which can, afterward, be as readily closed, when it is desired to pump out and raise the vessel.

ROTARY ENGINE.—Geo. W. Goodwyn, Petersburg, Va.—The object of this invention is to furnish a rotary steam engine which shall be simple and cheap in construction, and shall economize the power of the steam to the greatest possible extent.

CAR BRAKE.—W. W. Babcock, Harmar, Ohio.—This invention has for its object to furnish a more simple and powerful car brake than any hitherto employed, and to this end consists in a peculiar combination of the screw with a toggle-joint lever whereby the brakes can be at any time applied by a child with so great force as to instantly stop the wheels.

MOLD BLACKING MACHINE.—Ben. S. Benson, Baltimore, Md.—This invention is an improvement in machines for blacking the molds used in casting metallic pipe, and consists in a new arrangement of the mechanism by which the blacking is fed to the brush through the stem that holds the latter, and is thrown against the walls of the mold from among the bristles of the brush.

PRINTING PRESS.—Royal Cummings, Newport, Vt.—This invention relates to a new and improved printing press of that class in which the paper is printed from a continuous roll, and both sides of the paper at one operation, or during a single passage of the paper through the press.

CORN PLANTER AND CULTIVATOR.—Charles Dyer, Coal Run, Ohio.—This invention relates to a new and improved corn planter and cultivator.

CULTIVATOR.—Jacob H. B. Kelser, Chambersburg, Pa.—This inventor relates to a new and improved cultivator and it consists in a novel construction of the same whereby the device may be used in a rough or stony ground without the liability of breaking or injuring it.

TRACE FASTENING.—James Brown, Mattewan, N. Y.—This invention has for its object to furnish an improved fastening for securing the traces to the whiffletrees, which shall be simple in construction, easily attached and detached, and not liable to become accidentally detached.

WASHING MACHINE.—E. F. O'Neill, Prairie du Chien, Wis.—This invention has for its object to furnish an improved washing machine, simple in construction, easily operated, and effective in operation, doing its work quickly and well, and in such a manner as not to injure the clothes or break the buttons.

BUT HINGE.—Lorenz Maschauer and Wm. Frankfurth, Milwaukee, Wis.—This invention relates to a new and useful improvement in but hinges of that class which are provided with a removable or detachable pin to admit of a door, shutter, or gate being unhung without unscrewing either leaf of the but.

PHOTOGRAPHING ROOM.—George K. Proctor, Salem, Mass.—This invention consists in constructing a room or apartment for photographing purposes, in such a manner or of such a form that the rays of light from a lamp placed within said room or apartment will be reflected and concentrated upon the person or object to be photographed, so that photographing may be successfully performed at night by artificial light, or other than that of the sun.

GRAIN DRILLS.—John T. Lynam, Jeffersonville, Ind.—This invention relates to a new and useful improvement in grain drills.

SWAGE FOR UPSETTING SAW TEETH.—Warren P. Miller, New York city.—This invention relates to a new and improved swage for upsetting saw teeth, bringing the cutting edges of the same to a proper cutting edge and at the same time spreading or expanding the edges of the teeth to a necessary width to insure a free cut of the saw and the ready expulsion of saw dust from the kerf.

SPRING BED BOTTOM.—Thomas J. Gaffney, Detroit, Mich.—This invention has for its object to improve the construction of spring bed bottoms, so as to make them stronger and more durable in construction and more convenient in use.

SCHOOL DESK.—John Mealey, Fairville, St. John, N. B.—This invention has for its object to furnish an improved desk, designed for use in school rooms, lecture rooms, public halls, etc., which shall be simple in construction, strong, and durable, and which shall be convenient for use, being easily adjusted for use as a desk, table, or seat simply, as the occasion may require.

STITCHING HORSE.—Thomas Depp, San Marcos, Texas.—This invention has for its object to improve the construction of the stitching horses used by harness makers, saddlers, etc., so as to make them more convenient and satisfactory in use.

SOLDERING GALVANIZED IRON.—Patrick B. Bonner, New York city.—This invention has for its object to improve the manner of soldering galvanized iron, so that the solder may not crack or break off, and will make the seam perfectly tight.

SPRING.—Frederick Cajar, New York city.—This invention consists in constructing the springs of corrugated metal and arranging the plates or strips so as to take the strain in the direction of the breadth of the same.

COMPOUND FOR PROMOTING THE GROWTH OF THE HAIR.—Benjamin F. Atwood, New York city.—The object of this invention is to provide a vegetable hair dressing, which will strengthen the hair and promote its healthy growth. It has been found by ample practical tests to promote the growth of hair wherever the same has been lost from fever, and in other cases where the hair follicles are not completely closed.

ARTIFICIAL LIMB.—Geo. B. Head, Albany, N. Y.—This invention consists in the construction and arrangement of the parts by which the necessary movements are produced, but relating more particularly to the method of operating the knee joint.

BIT STOCK.—George Richards, Richland Center, Wis.—The object of this invention is to provide a brace or bit stock the handle of which is extensible, for obtaining more leverage when the resistance requires it. This is accomplished by forming the stock in three separate pieces and uniting them in such a manner that the grasp or handle can be extended at will.

APPARATUS FOR TOLLING GRAIN.—Wm. S. Widger and Wm. M. Read, Fairfield, Iowa.—This invention consists of a rotatory funnel provided with a spout which may be adjusted to the same fractional portion of the surface of the mouth of the funnel as the fractional part of the grain to be taken, which is arranged so that the grain must pass through it while it is in rotary motion, whereby an amount of grain equal to the fractional proportion of the spout to the funnel is diverted from the main portion and turned into a separate channel.

TRAMS FOR GAGING MILLSTONES.—Thomas R. James, St. Louis, Mo.—The nature of this invention relates to improvements in apparatus for framing or gaging the faces of the upper or running stones of grinding mills, and it consists in providing a tram brush which may be secured to the stone by the ends of the same being wedged into the recesses provided for the driver having a central opening through it vertically, provided with set screws wherein a shaft may be set with its lower end resting in the socket on the ball of the stone, whereby the said shaft may be nicely adjusted to a position exactly perpendicular to the face of the stone. On the upper portion of the said shaft may be arranged a swinging arm which is provided with one or more gage points.

STATION INDICATORS FOR RAILWAYS.—Elihu Spencer, Ottawa, Canada.—This invention relates to certain new and useful improvements in station indicators for railways, which improvements are more especially applicable to an implement for the above purpose, which was patented by the present inventor December 21, 1867.

LOCOMOTIVE SMOKE-STACK.—J. A. W. Just, Savannah, Ga.—The object of this invention is to provide a locomotive smoke-stack with such detailing devices that no coal, cinders, nor sparks, can pass through, and with the escaping smoke, while the draft is not in the least impeded.

GRIST MILL.—Bennet Whitney, New Brunswick, N. J.—The object of this invention is to construct a grist mill that the upper stone will be allowed to swing in either direction, and can at the same time be adjusted up and down; that no meal can escape through an upper opening in the curb; that the whole mechanism can be easily taken apart, without disturbing the bottom of the curb, and that the hopper and its shoe can be arranged on either side of the mill, as may be desired.

ELASTIC ROLLER.—Allen Magowan, Boston, Mass.—The object of this invention is to produce a roller for wringers and other machinery, on which the elastic will not slip on the mandrel, and which will be also durable and soft. The invention consists chiefly in forming an elastic core, by dipping a string into liquid raw india-rubber, and in then winding the string thus saturated around the mandrel. Thus a strong elastic core is produced, which will not slip on the mandrel, especially if projecting arms are formed on the mandrel. The invention also consists in the use of longitudinal tubing for winding the roller on a square handmill.

GRAIN CLEANER.—John E. Anderson, Bolling Springs, Pa.—The object of this machine is to accomplish the cleaning of grain in the most effective and perfect manner, and with the fewest and simplest arrangement of parts. It consists, in general terms, of a scouring wheel, revolving with high speed encountering the entering grain, and agitating it, thereby thoroughly loosening it from the chaff, and cockle, and chaff. The grain is then delivered from this wheel, upon an inclined screen, when it encounters a blast of air from a revolving fan wheel or blower, located within the general frame of the machine, and immediately below the scouring wheel. The screen is not the plane surface heretofore used, but is corrugated in the form of steps running crosswise to the direction of the blast from the fan wheel, so that the kernels of cleaned grain will catch against the corrugations, and be retained from being blown out with the chaff.

LOOM.—A. W. S. Ivis, Birmingham, Iowa.—This invention relates to improvements in hand or power looms for weaving cloth, and it consists, first in an improved automatic picker motion; second, in an improved arrangement of harness operating mechanism; and, third, in an automatic take up apparatus, whereby a very nearly uniform tension is maintained on the cloth by means of a weighted take up lever, which is operated by the lay.

TRACE FASTENING.—F. W. Dean, Tremont, Ill.—The object of this invention is to provide a simple, efficient, and easily operated trace fastening. It consists of a link hinged to the single tree in such a manner that it will hold the trace from slipping off from the pin in the end of the single tree, and may also be moved away from the pin when the trace is to be slipped over the pin.

CARDING MACHINE.—Charles F. Morrison, Rifton Glen, N. Y.—This invention consists in providing carriers to receive the waste that falls from the feeding rolls, main card, and doffer, and carry it to a slipping roller, whereby it is returned to the carding rollers again and reworked.

HAMMER HATCHET.—T. S. C. Fin, Harrington, Maine.—The object of this invention is to provide a simple and convenient tool. It consists of a hammer having short claws, and a socket extension, all of one continuous piece of metal, in combination with a hatchet blade fitted to screw into the upper part of the chamber in rear of the claws. By this construction the hatchet blade is removable at will, or may be turned at right angles to its usual position, to enable the claws to catch the head of a closely driven nail.

FILTER AND HEATER.—R. R. Fennor, Urbana, Ill.—This invention consists in placing within the heater pieces of cast iron, by the presence of which in the heater the lime, which is in a fluid state, will at a certain degree of heat become crystallized and adhere to the pieces of iron to a great extent. The heated water is then passed through a filter which separates the balance of the lime.

COMPOSITION FOR BURIAL CASES.—J. R. Hathaway, Westfield, N. Y.—This invention relates to improvements in burial cases, and consists of an improved composition of matter for constructing the same either wholly or in part, or for ornamenting the same.

MACHINE FOR TWISTING JACK BANDS.—J. Collier, Morenci, Mich.—This invention consists of an arrangement of rotating hooks and a stationary hook for twisting the yarn, which are automatically thrown out of gear when the yarn has been sufficiently twisted; also a yielding twisting hook to which the yarns are transferred from the stationary hook to be finally twisted together.

TWEER.—O. G. Newton, Edinburg, Mo.—This invention consists of a ball valve, provided with cavities to receive the cinder, arranged on a rotating shaft having a vertically-adjustable bearing whereby it can be raised and lowered to be rotated for the discharge of the cinder, and also for regulating the passage of air to the fire.

PEACH BASKET.—Henry Carpenter, Brooklyn, E. D., N. Y.—This invention consists in a novel manner of securing the bottom in the basket.

CURTAIN FASTENING FOR CARRIAGES.—Ephraim Shepard, New York City.—This invention relates to a new and improved curtain fastening for carriages, whereby a curtain may be readily fastened and unfastened, and be firmly secured in position when in a fastened state.

SULKY CULTIVATOR.—P. R. Tottam, Adams, Ill.—This invention relates to a new and improved sulky cultivator for cultivating crops grown in hills or drills.

STIRRUP.—John Bond, Versailles, Ill. The object of this invention is to provide an improved stirrup with an oscillating bottom that shall be more agreeable to the rider, and which will, in case the rider is thrown from the horse, readily open and disengage his feet. It also consists in providing a swinging foot piece so connected to the pendant straps as to become disconnected when by any cause they are spread outward sufficiently, and for which purpose they are made sufficiently flexible.

WATER HEATING APPARATUS.—J. C. Ryan, Chicago, Ill.—The object of this invention is to provide an apparatus for heating water and circulating the same to obtain the greatest amount of steam heat or hot water from the fire of an ordinary stove. It is designed more particularly for shop and household use, though it is equally applicable in situations where it is desirable to econ-

omize fuel and utilize the heat of one stove for warming other parts of the building.

HAY ELEVATOR.—F. A. Crane, Zanesville, Ohio.—The object of this invention is to facilitate the operation of lifting hay from the wagon and discharging it into the hay mow or a barn. It also consists of a plank or board provided with internal rails affixed on each side of the lower edge of the said plank, and on which a hanging truck and its accessory apparatus travels to and fro. The hanging truck is provided with pulleys and rollers, and a catch lever, the latter being so arranged with reference to the accessory parts of the apparatus that the truck will be held stationary until the hay is lifted to the proper height, when the catch lever will be lifted, and the truck with its suspended load of hay will be free to be drawn along the rails to a position over the hay mow into which the hay is to be discharged from the fork.

BEE HIVE.—Benjamin Leckrone, Somerset, Ohio.—This invention relates to several improvements in the construction of bee hives, whereby the entrance of the bees to, and their movements and operations in the hives, can be perfectly regulated and controlled; and whereby the hive can be more conveniently handled, and will be better adapted to secure the health and comfort of the bees, than any hitherto in use.

HOTBLAST FURNACES.—P. and R. Hoop, Berlin Cross Roads, Ohio.—This invention consists in passing the blast of air to be heated for fanning the flame of a puddling furnace through a series of hollow rings placed one above another, in a chimney, the products of combustion beneath rising through the rings and the blast circulating in the rings one after another, said rings being connected by means of pipes for the transmission of the air current from one to another, which pipes pass outside of the chimney, and are arranged to be removed and replaced at pleasure.

HORSE HAY RAKE.—Solomon C. Brinser, Middletown, Pa.—This invention consists in locking the head of a horse hay rake by means of a simple toggle arrangement, in such a manner that it cannot rotate to any degree upon its bearings, but is compelled to bear the teeth steadily forward without change of elevation, as in raking over even ground; also, in converting the before-mentioned locking mechanism into an arrangement of parts for tripping the rake head to avoid stones or the roughness of uneven surface, said tripping arrangement being operated by means either of a hand or foot lever.

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 \$1.00 a line, under the head of "Business and Personal."

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

J. M. C., of Pa.—Your suggestion about the use of a current of water passing through a tube to assist in propelling a boat is very old.

H. F. R.—We know of no good cement that will resist water, and which is adapted to join glass and wood, that is at the same time elastic to any extent.

J. N., of Ala.—In our opinion the statement that common salt put into a kerosene lamp, will prevent the explosions which often take place in the use of bad oil, is incorrect.

J. R., of Mo.—We advise you to send for Henry Carey Baird's catalogue, of which we give a notice this week. By an examination of the contents of the books as therein described you will be able to make a judicious selection of the books you need.

R. M., of Mo.—The star you see is called Aldebaran. It is in the constellation Taurus—the bull. It forms the eye of the bull as pictured on astronomical maps. It is a star, not a planet. The glass of which you speak will not probably enable you to see the rings of Saturn, much less his satellites. You can, however, see interesting objects on the moon's surface with it and also the moons of Jupiter.

J. M. D., of Mass.—"Why will a small dry needle float on the surface of water?" Water although a liquid still has a certain amount of cohesive force. This force is sufficient to prevent the breaking of the surface by the weight of a small needle provided it be dry and laid very carefully upon the water. "Why will smoke from a locomotive form rings as it issues from the smoke stack in damp weather?" The dampness of the weather has nothing to do with it except that there is apt to be less wind in damp weather than in dry, and the smoke is more apparent. Gaseous volumes puff on suddenly from the mouth of a tube often assume the form of rings, common examples of which are the smoke from a cannon in a still morning, or the rings of tobacco smoke projected from the mouth held in a proper manner.

A. B., of St. Petersburg, Russia, sends us a paper on boiler explosions comparing one of the theories of Mr. Norman Ward—that of unequal temperature.—For a native Russian the letter, written in English, is very creditable, but the ideas advanced are neither new nor useful; they have been more than once published in our columns.

B. C., of S. C.—Your theory of belts is valueless. Belts cannot, in any way increase power. They are only the transmitters of power, and as such, standing between the source and the result, necessary evils.

J. P. G., of R. I.—The amount of surface of a pulley embraced by a belt is not an essential element of calculation in estimating the amount of power it may transmit. A belt that merely impinges upon a pulley may be as effective as though it came in contact with two thirds of its circumferential surface.

W. M. L., of Mass., asks if a thread of a pitch eight to the inch would be too "heavy" for a three quarter inch shaft. If he means a bolt to resist a strain or for securing two portions of a structure, such a grade would undoubtedly detract from its strength; but it might be used in some cases, as for a worm or a feed. A three quarter inch bolt should not receive a heavier thread than ten to the inch. See articles in back numbers of the SCIENTIFIC AMERICAN relative to the American system of bolts and nuts.

B. F., of Tenn.—Stone drills should not be finished by the file before hardening. We know it is a common practice, and that cold chisels are sometimes so prepared. The practice is, in either case, not to be recommended. The grindstone is the proper tool for the purpose.

S. F. M.—Yellow rays have so actinic effect upon sensitive plates; hence photographers use deep yellow glass through which to admit light into their operating rooms. Glass is the best material for the sensitizing bath.

T. D., of N. J.—The buoyancy of your immersed buckets is the same whether open or closed; their position has nothing whatever to do with the force with which they seek the surface.

W. J., of Nebraska.—No experiments yet tried give data for an answer to your query. An experiment made with a special view to determining it would be of value. You can easily try it for yourself, and we should be glad to learn the result.

W. W., of Ohio.—The substances used for rendering clothing water-proof, are either ordinary oil paint, or varnish, very liable to crack, or what is much better, india-rubber dissolved in benzene. For this purpose pure rubber is required. Some other processes are used, but would not be available to you, as they are either kept a secret, or are expensive.

J. D. C., of Mo.—"Can the bearing of a shaft of wrought iron 5/8 inches in diameter, if found to be turned slightly too small, be made a

good fit by heating it in a common blacksmith's fire and allowing it to cool? Second, Can a locomotive driving wheel be pulled on tight enough before the tire is on with an inch and one eighth bolt and a 3/4 foot wrench, supposing the taper to one sixty-fourth of inch." Answer to both questions No.

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