LOW WATER ALARM.—F. S. Davenport, Jerseyville, Ill.—This invention relates to a new and improved device for ascertaining the hight of water in a steam boiler, and it consists in operating a valve by a float, whereby an alarm is given when the water in the boiler falls below the required quantity.

MIXING STEEL AND IRON.—James Cartwright, Youngstown, Ohio.—This invention relates to a new and improved method for combining steel and iron, whereby a greatly improved article is produded, as regards its tenacity, flexibility and strength.

HAY FORK.—Joseph H. Walker, Grand Rapids, Mich.—This invention relates to a new and useful arrangement, whereby the labor of handling hay is greatly lessened, and it consists in a fork of peculiar construction, which is attached to an irregular shaped frame, and so arranged that the position of the fork can be varied.

GRAIN MEASURING APPARATUS.—E. O. Melvin, Brooklyn, Wis.—In this invention the main feature is a lubricated shute provided with a gate which alternately closes one or the other branch of the shute, and which is connected with a registering apparatus that records the number of times the gate has been opened and closed.

SHINGLE MACHINE.—David L. Peacock, Rockport, Ind.—In this invention the shingle is split from a block, and planed while passing through the machine.

PRESERVE JAR.—F. J. Shefferly, Detroit, Mich.—This invention relates to a new and improved method of manufacturing jars for preserving fruits and other articles of diet of a similar nature, and it consists in the novel and improved method of sealing or securing the cover of the jar to the neck.

BOLT CUTTER.—E. A. Sloat, Theresa, N. Y.—This invention has reference to a new and improved method of cutting off the ends of bolts and rivets, an operation which has hitherto been performed by means of a cold chisel and hammer, and the invention consists in the arrangement of two cutters, the edges of which are operated in regard to each other like shears, but upon one of which cutters a compound lever purchase is obtained.

SPRING BED BOTTOM.—Gottlieb Koenig, Plymouth, Mich.—This invention relates to a new and improved method of constructing the bottom of spring beds, and the invention consists in an arrangement of bars and springs within the bottom, whereby the action on the springs serves to expand them instead of compressing them, thus preserving their elasticity and usefulness for a long period.

HAY KNIFE.—Charles A. Fisher, Geneseo, Ill.—This invention relates to a new and improved method of constructing or shaping knives for cutting hay, whereby the same are rendered more convenient in handling and more effective in operation than hay knives have hitherto been.

HORSE POWER HAY FORK.—Charles E. Gladding, Troy, Pa.—This invention consists in attaching to the handle and to the bait of the fork a jointed connection, formed of different parts or sections, which in the different positions the fork assumes as it is used in elevating and discharging the hay, places it entirely under the control of the operator, and greatly increases the value and usefulness of the invention.

SPRING BED BOTTOM.—S. J. Wingate, Decatur, Ill.—This invention has for its object to furnish an improved spring bed bottom, simple in construction, not liable to get out of order, and which may be readily attached to and removed from the bedstead.

CULTIVATOR.—C. A. Harper, Wheeling, Ind.—This invention has for its object to furnish an improved cultivator, so constructed and arranged as to remove the clods and rubbish in front of the plow, so that they may not be thrown against or upon the small plants being cultivated, and which will enable the plows to be much more easily raised to pass over stumps and other obstructions, and to be more easily transported from place to place.

LOCKING CAR SEATS.—Geo. R. Bayley and Jno. McCluskey, Algiers, La.—This invention relates to an improvement in locking and unlocking the reversible seat backs of railroad passenger cars, whereby all the seat backs on one side of the car can be locked or unlocked simultaneously.

DOOR HINGES.—Charles Dupré, Louisville, Ky.—This invention relates to an improvement in door hinges, and consists in a metal plate countersunk in the door, coinciding at the top of the door with a similar plate in the rabbet of the door frame, each furnished with projecting arms or ears connected by a pin; at the bottom of the door is a similar eared plate. A screw passing through the ear into a socket completes the hinge and renders the door adjustable in place.

TIRE SHRINKER.—Edward B. Decker, Bedford, Ill.—This invention has for its object to furnish an improved machine for shrinking tires, which shall be simple in construction, convenient to be used, and powerful in operation.

JOURNAL BOX,—Geo. H. Henfield, San Francisco, Cal.—This invention relates to improvements in the construction of bearings for railroad car axles or other journals, and consists in forming a brass or other metal attachment in connection with a cast iron box or shell, in such manner as to hold securely in place sections of Babbit or other soft metal for the bearings.

THREE-HORSE CLEVIS.—E. M. Potter, Kalamazoo, Mich.—This invention consists of a clevis provided with two grooved pulleys cast together and of unequal diameters; the chain from the doubletree winding on the smaller pulley, and that of the singletree winding upon the larger one, by which means a compensatory action is set up which enables three horses to be worked abreast in plowing or other equivalent work.

UTERINE ELECTRODE AND ABDOMINAL SUPPORTER.—A. J. Steele, New York city.—This invention relates to the application of electricity to the uterus and vagina when the latter are in different pathological conditions. It consists of insulated wires bent in suitable shapes and covered with a sponge or other equivalent substance for providing a medium of conduction from the insulated wire to the diseased part.

ICE SLEIGH.—John Rancevau, Carthage, N. Y.—This invention has for its object to furnished an improved ice sleigh, so constructed and arranged as to be propelled rapidly and conveniently over the ice by those riding in said sleigh.

TINMAN'S FORMING MACHINE.—Wm. Stine, Elmore, Ohio.—This invention relates to an improvement in a tinman's forming machine, and consists in a gage attached thereto for flaring cylinders or tubes at the end.

BAG FASTENER.—Daniel Overholtzer, Polo, Ill.—This invention relates to an improved device for fastening the mouth of a bag of grain or other commodity, and consists in an iron hook pivoted to a link, and so arranged in connection with another link through which it passes that by moving in one pivot the bag is fastened with a cord attached to both links, and by moving in the opposite direction the bag is unfastened.

ENDLESS CHAIN REVERSIBLE POWER FOR DRAWING CARS, ETC.—W. McCreery, Pittsburgh, Pa.—The object of this invention is to move cars or other heavy objects in and out of a depot or storehouse where steam power is located, by attaching a reversible gear to be connected when required with the thing to be moved.

MACHINE FOR BRAIDING WHIP LASHES.—Phineas L. Slayton, New York city.—This invention relates to an improved machine for braiding whip lashes, of any required number of strands, and it consists in a stationary hollow sphere open at top and bottom and supported between top and bottom plates by standards, which hollow sphere is cut up into segmental pieces or sections with channels or open passages between them to serve as guideways for a series of fingers that are moved around to lay the strands by means of segments of an external sphere or shell, which revolve on their own independent axes on opposite sides of the internal sphere, in pairs at angles to each other.

BUCKWHEAT HULLING MACHINE.—Joseph Baysore, Freeport, Ill.—This invention relates to improvements in a machine for hulling buckwheat or other grain.

BORING AND FITTING THE FELLIES AND SPOKES OF A WHEEL.—Albert Brush, East Constable, N. Y.—This invention relates to an improved mode of boring the fellies of a wheel.

SPOOLS OR BOBBINS.—A. P. Holmes, Great Falls, N. H.—This invention consists in loading or weighting a wooden spool or bobbin such as is used in cotton and woolen mills, by applying a metallic sheathing to the cylinder, or an equivalent thereof.

FLOURING MILL.—Wm. Craig, Uniontown, Pa.—The object of this improvemen, in the construction of flouring mills is to dispense with the heavy, complicated, and expensive machinery in general use in small country mills, and provide a complete mill with two run of stones for both merchant and custom work, the machinery of which shall be simple and direct in its operation.

GRAIN THRASHING MACHINE.—John F. Skinner, Brasher Iron works, N. Y.—This invention relates to a new and improved means for operating or giving motion to the shoe which contains the grain screen; to an improvement in the construction of the grain and straw carrier; to an improved arrangement of a belt with a pulley and spring arranged in such a manner as to render a single belt efficient in driving the straw and grain carrier face and beater cylinder; and to the employment or use of friction rollers in connection with the peculiarly constructed grain and straw carrier, said parts being all so constructed and arranged as to possess important advantages.

HORSE RAKE AND TEDDER.—Frederick E. Nearing, Brookfield, Conn.—This invention relates to a combination of a horse rake and tedder, and it consists of a peculiar construction and arrangement of parts, whereby the device may, by a very simple manipulation, be readily converted from a rake into a tedder, and *vice versa*, and rendered capable of operating in either capacity equally as well as if made specially for either purpose.

BUCKLE.—Louis Elsberg, New York city.—The principal objects of this invention are, first, to unite the two loops of the buckle, the one for the attached strap, and the other for the buckling strap in such a manner that traction on them in opposite directions draws the bar of the tongue and the buckling loop into closer contact, and thereby holds the buckling strap the more firmly.

CULTIVATOR.—Joseph Widman, Panola, Ill.—This invention relates to a cultivator of that class designed more especially for cultivating corn and other crops, which are grown in hills or drills. The invention consists in a peculiar construction of the machine, whereby it may be readily converted from a riding or sulky cultivator into a walking cultivator, or one without a driver's seat, and a very simple and efficient cultivator obtained.

EXTENSION AND CLAMP CLOTHES POST.—George Dittenhaven, Napoleon, Ohio.—This invention relates to an improvement in clothes posts, and consists in a post working in a groove, and of a clamp for securing the line.

CORN PLOW.—S. H. Cox, and W. H. Pence, Mattoon, Ill.—This invention has for its object to improve the construction of corn plows or cultivators so as to make them more simple and durable in construction, and more convenient and effective in operation.

CULTIVATOR.—John W. Doud, Forestville, Iowa.—This invention has for its object to furnish a simple, substantial, durable, and cheap cultivator for putting in all kinds of grain sown broadcast, and for preparing the ground for winter wheat, which shall be so constructed as to economise time, labor, and seed, in putting in the grain, the machine destroying the weeds, and covering the grain uniformly, so that it can all come up.

WINDOW BLIND AND NETTING.—John R. Wharry, Moundsville, West. Va.—This invention relates to a new and useful improvement in the construction of window blinds, and in the construction, attachment, and arrangement of netting frames to the window casing, whereby the movable slats of blinds are more neatly connected, and more conveniently operated, and whereby the netting frames are more convenient, and more effectually prevent the intrusion of insects.

FRUIT JAR.—J. M. W. Kitchen, New York city.—The present invention more particularly relates to that class of fruit jars provided with a screw thread for receiving the top or cover.

RAILROAD SWITCH.—W. L. Rogers, North Cornwall, and W. E. Crane, New Britain, Conn.—This invention relates to a railroad switch of that class which are commonly termed self-acting, and which are operated by the cars. The invention consists in a peculiar mechanism employed to serve as a stop to prevent the casual movement of the switch, and in a mechanism employed for moving the switch.

GATE.—G. P. Stebbins, Sparta Centre, Mich.—This invention relates to a gate of that class in which certain appliances are used to admit of them being opened or closed under the weight of the vehicle which passes through them, and which are commonly termed self-acting. The invention consists in the peculiar means employed for operating or opening and closing the gate.

ATTACHMENT FOR PLOW.—William Bennett, Rushville, Ind.—This invention relates to an attachment for corn or cultivator plows, for the purpose of preventing the mold board or share from casting clods of earth upon the plants during the process of plowing the same.

SAW.—George Walker, Middletown, N. Y.—This invention relates to an improvement in saws, both reciprocating and circular, whereby fixed teeth are made to possess all the advantages of the insertable teeth which are now coming into general use, and with far less expense, both as regards the first cost of the manufacture of the saw and the expense of keeping the same in perfect working order.

ENVELOPE.—F. Marion Shields, Macon, Miss.—The present invention consists in so forming an envelope that after having once been used it is susceptible of again being used by properly folding it therefor.

WHIP.—J. S. Cook, West Groton, Mass.—The present invention consists of an attachment to a whip stick for receiving and holding the lash portion of the whip, whereby the lash can freely turn upon the whip stick without winding around the stick as is now the case with the lash when secured to the whip stick by a string or strap.

STRAW OR HAY CUTTER.—A. J. Bell, Bloomingburg, N. Y.—The present invention relates to that class of hay or straw cutters the cutting blade of which is carried by a frame arranged to have an up and down motion in a vertical plane.

AUTOMATIC WATER GATE.—H. Besse, Delaware, Ohio.—This invention relates to a gate provided with certain devices which shall accomplish its opening and closing by the water of the stream which it spans.

DISH LIFTER.—D. E. Roe, Elmira, N. Y.—This invention is for the purpose of lifting hot plates or dishes from the top or oven of stoves. It consists of two wire claws affixed to a short wooden handle, one claw being made stationary and the other to yield against the tension of a spring.

SHINGLE MACHINE.—H. Woodman, Saco, Me.—This invention relates to a machine for sawing and planing shingles, and it consists of a rotary feed table, circular saw, and rotary planer, all arranged and combined to perform the desired work in a satisfactory manner.

HAY ELEVATOR.—Harvey McCown and Luther M. McCown, Little Beaver, Pa.—This invention relates to a device for elevating hay from wagons and depositing it in bays or mows, in bars or upon a stack. The object of the invention is to obtain a device for the purpose specified which will admit of the hay not only being elevated with facility but also being conveyed, after it reaches its highest point, over the spot where the hay is to be discharged.

WATER WHEEL.—George W. Wheeler and George V. Allen, Hartford, Vt.—This invention relates to an improvement in that class of water wheels which are keyed on a vertical shaft and work horizontally within a suitable case. The invention consists in a peculiar construction of the wheel and arrangement of the buckets, whereby a large percentage of the power of the water is obtained,

Business and Personal.

The charge for insertion under this head is one dollar a line.

Answers to Correspondents.

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

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

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

H. A. M., asks "if the electric current produced by a Faraday magneto-electric machine will excite magnetism in a common electro-magnet formed of coils of wire around a horse shoe of iron." The common machines of this class give to and fro currents, that means the currents go (for every revolution of the coil) alternately in opposite directions and therefore produce only shocks, but neutralize the magnetic and chemical effects which electric currents moving in one direction only may produce; if, however, the magneto-electric machine is furnished with a so-called commutator, which is a contrivance reversing one current, and thus bringing them all in the same direction, it will magnetize a horseshoe, provided the wire in the coil producing the currents is not much thinner than that around the horseshoe. This principle has lately been applied in producing startling results in electrical science.

A. W., of Ind.—"How is the power of the wind estimated on a wind mill; by the actual weight of the air or the momentum? For instance, the wind is moving at the rate of 16 feet per second and strikes a surface of one foot square; would the mechanical effect be one lb. or 16 lbs.?" It would be neither. Wind moving at 22 feet per second exerts a force in pounds per square foot of 1.107.

J. S., of Miss.—If you wish to prepare your copal varnish so that it will be colorless, a little extra trouble will accomplish your object. Upon each piece of copal, drop a little rosemary oil, and select only such pieces as become soft on contact with the oil. These pieces are ground and passed through a fine sieve so as to be reduced to powder, which must then be placed in a glass and a corresponding volume of rosemary oil poured over it. After stirring the mixture it is transformed into a thick liquor, and after standing two hours a few drops of rectified alcohol is added and intimately mixed. Repeat the operation until the varnish is of the right consistency; finally decant the clear liquid. This varnish is adaptive to either wood or metals.

P. S., of Mass.—In the multitude of counsellors there may be wisdom, but when we receive in two weeks six communications on the "heptagon in a circle," five on "tides and their causes," eleven on the "solution of plane triangles," and thirteen on the "day line," we may be excused if we do not see the propriety of absorbing the room necessary to publish each one. We are grateful to our correspondents for their promptness in responding to suggestions made through our columns. We are always glad to receive them, but if their articles are not always published it should be attributed to the limits of our columns and not to boorish discourtesy.

A. J. H., of Mass., wishes to know how to galvanize cast iron. He treats his iron with acids to obtain a clean surface, and then plunges it in melted zinc, but is unsuccessful. There is some difficulty in galvanizing cast iron because of its irregularity of surface. Where the work is intended to be perfect and permanent, a deposit of pure iron by means of the battery is first given the casting. We presume that an ordinary coating may be obtained by simple immersion in the melted metal, which, however, should not be zinc only, but be composed of 202 parts by weight of mercury to 1·29 of zinc.

S. B., of N. Y., finds difficulty in tempering dies for a power hammer and asks how to make them stand. The dies should be of the best steel, and instead of being heated in an open fire should be packed in a cast-iron box with ground bones and heated gradually to a red, plunged into cold water, and drawn to a deep red inclining to blue. "Ede on Steel" is the best treatise we know of on hardening and tempering. It can be obtained at Appleton's, 445 Broadway, New York city.

S. W., of Conn., is making a lot of hollow steel punches, the hollow extending from the end up about seven eighths of an inch. He finds nine out of ten crack in hardening. Of course they will. The remedy is to drill a pin hole transversely across the body of the punch to meet the top of the hollow. This allows the steam to escape, and will entirely prevent the cracking while it will not materially weaken the punch. Indeed, all similar articles should be so treated before being hardened.

M. F. W., of Pa., cannot make a large pulley hold on the shaft. The key, although of steel and seated in a key-way or slot, "cuts into slivers" and allows the pulley to turn on the shaft. Our advice is to discard the key altogether, bore and tap one, two, or three holes through the hub, fit steel cup-ended screws, and no more trouble need be apprehended. These screws have a recess drilled at the end and the outside turned down on a bevel to the edge of the hole, making a circular edge. Then harden the end and insert the screw.

J. G. P., of N. Y.—The eccentrics of marine engines are secured to the shaft by three keys hollowed on the shaft side to fit the rotundity of the shaft. They pass through key-ways in the hub, and are held to the shaft by set screws passing through the hub and bearing upon the top of the keys. The keys are driven home and the screws set down on them. It is an easy matter to move eccentrics thus secured,

A. M. G., of Ark.—Raw hide is one of the most tenacious substances known. It is extensively used for pickers for looms, and in some parts of South America, where the climate is very dry, is preferred to iron for tiring wagon wheels. A recent application of it for window cords and dumb waiters manufactured by a firm in Williamsburgh, N. Y. is proving a success.