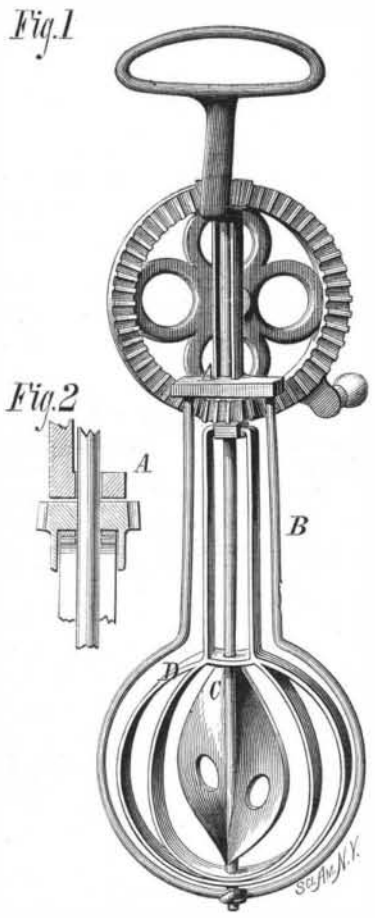
NEW EGG BEATER.

The accompanying engraving shows an improved egg beater recently patented by Mr. Harry C. Mann, of 4850 Cherry St., Frankford P. O. While the egg beater in some respects resembles others in market, it differs from them in important particulars. It is so simple and well designed that the parts may be easily made and readily put together without special machinery or skilled labor. The essential feature of this invention is the perforated spiral



MANN'S IMPROVED EGG BEATER.

disk secured to the central spindle and forming a screw or propeller-shaped blade, which renders the device very efficient. The egg beater is shown in perspective in Fig. 1, and Fig. 2 is a detail view of the lower spindle bearing, showing connection of the lower pinion with the beater, D.

On the lower end of the handle there is a cross piece, to which the ends of the wire, B, are secured. The center of the wire, B, is formed into a coil or eye forming a bearing for the lower end of the spindle, C. The latter has near its lower end a perforated metallic disk, and at the top a pinion which is engaged by the driving wheel. The perforated disk is twisted, forming a propeller wheel, which, together with the curved strip, D, rapidly and thoroughly beat the eggs. The bent strip, D, is connected with a pinion placed loosely on the spindle, C, and meshes into the drive wheel. By this arrangement the two movable parts are driven in opposite directions.

NEW AGRICULTURAL ENGINE.

The annexed engraving represents a very compact and simple agricultural engine made by G. Westinghouse & Co., of Schenectady, N.Y. This engine, in its general design and in the details of its construction, seems well adapted to work for which it is intended. It is very light, weighing complete but 3,800 lb., and its economy in the consumption of fuel is worthy of special mention, as it consumes only 500 lbs. of coal per day when working 10 horse power.

This engine has an upright boiler shell, but it is not open to the objections usually brought against upright boilers. The tubes in this boiler are horizontal, and so arranged that they are filled with water so that a constant circulation is maintained in them. The difference between this and boilers having vertical tubes is material; the danger of burnt tubes and crown sheets is avoided, and by reason of the small volume of water contained in the tubes, steam is made rapidly. The circulation of the water in the tubes tends to keep them free from sediment, and they do not become incrusted with scale. The boiler may be easily taken apart at the junction of the upper shell and fire box; and this being done, the tubes are all exposed and the inner surface of the boiler placed within reach for cleaning or repairs.

The boiler is surrounded with a sheet iron casing, leaving a space between it and the boiler shell. This space acts as a flue for conducting the waste heat from the fire box, and affords complete protection against condensation, and in addition to this it receives and extinguishes all sparks coming from the fire. No screen is required in the stack, and the annoyance resulting from screens becoming clogged, and the temptation to remove or open them in order that sufficient draught be obtained, are avoided.

The manner in which the engine and boiler are connected is clearly shown in our engraving. The bed or frame contains the heater, and is securely bolted to the fire box portion of the boiler. The engine has its cylinder, steam chest, guides, and main boxes all in one solid casting, and having all the work relating to the lining of the cylinder and main bearings done from a single position, absolute truth of all working parts is assured. The engine and its bed being connected with the lower part of the boiler, the greatest weight is below the center, and takes away all danger of turning over while on difficult roads. All parts of the engine are accessible from the ground and can be seen by the operator. Every desirable appliance for rendering the engine efficient, durable and convenient has been supplied. A blower and variable exhaust nozzle furnish means for regulating the force of the draught, and for making steam rapidly when required.

An ordinary team can handle this engine easily over common roads even with a full supply of water. Economy in the use of fuel and water is an important point to be considered by both the owner of an engine and by those who employ him, for there are but few places where fuel is too plenty, and in many places water is scarce or has to be drawn so far that it becomes important to make all the saving possible.

Systematic and thorough tests made with this engine have shown that less than 500 lb. of good coal and 350 gallons of water were sufficient to make steam for ten horse power, ten hours, as against 800 to 1,000 lb. of coal and from 400 to 450 gallons of water required by the average engine to accomplish the same work.

THE NEW WESTINGHOUSE AGRICULTURAL ENGINE.

Warmth and Energy.

In ancient times, energy of mind and strength of body were supposed to be the effects of warmth, while depression of spirits and bodily weakness were ascribed to cold. Modern science has explained and modified these theories concerning the production of physical and psychical force, but in the main it has confirmed the principle of causation. In a general sense, it may be said that animal heat, when duly generated within normal limits, is the concomitant of vigor. Practically, therefore, warmth is to be sought and cold avoided; but with this qualification, that the heat must be elicited by organic processes going on within the body, and not borrowed from without. The chief, if not the only use of wraps and "warm" surroundings is to avoid the loss of animal heat by abstraction. It is neither scientific nor hygienic, in any true sense, to trust to external sources of supply for the warmth we require to live well, happily, and usefully. The food is more than the raiment, and those who desire to help the poor and melancholy over their "dead points" in the course of life should be chiefly anxious to feed them well and sufficiently. So in the management of self—to live well is to feed appropriately. Stimulants do not give strength, because they cannot add to the normal and healthy sources of animal heat. Nutriment is the only true fuel.—*Lancet.*

LIFE PRESERVER EXHIBITOR.

Some time since we pointed out the necessity of making known the whereabouts of life preservers on board vessels, and of informing the public how to apply them so that in cases of accident they may be readily found and properly applied. Mr. C. C. Delhommer, of Carencro, Lafayette Parish, La., in response to the suggestion, devised and patented the exhibitor shown in the annexed engraving. It consists of a water tank made in the form of a human figure, having applied to it a life preserver in the position

DELHOMMER'S LIFE PRESERVER EXHIBITOR.

in which it should be worn. The water tank is an indispensable article on the vessel, and as it must of necessity be frequently visited by the passengers, the manner of applying the life preserver will be often seen, and the public will soon gain an accurate idea of the proper way of putting them on.

Most vessels have life preservers conspicuously labeled so that they may be readily found, but there are many people who would be entirely at a loss to know just how to apply them without some sort of instruction. The device shown in the engraving is a mute but efficient teacher ever on duty and within sight of the passengers. We are informed that Mr. Delhommer has taken steps to bring this invention to the notice of the proper authorities. Certainly too much cannot be done in this direction.

AGRICULTURAL INVENTIONS.

Mr. Charles A. King, of Cheshire, Ohio, has patented an improved machine for digging potatoes, which is so constructed as to dig the potatoes, separate them from dirt, clods, etc., and deposit them in a box or basket.

Mr. William R. Iles, of Fairmount, Ill., has invented an attachment to corn planters for dropping and marking the corn in perfect check row. The attachment has more especial adaptation to that form of corn planter in which two thin blades or runners are arranged on each side of the tongue so as to rest upon and run on the ground, which runners or blades are connected to a suitable framework and terminate in the rear in vertical spouts extending from the seed boxes, from which seed boxes and down which spouts the corn is dropped by the reciprocation of a slide extending from one to the other of said boxes.

Mr. John W. Fields, of Sherman, Texas, has invented a device for supplying water and air to the face and land side of a mould board, to prevent the earth from adhering to them. It consists in perforating the mould board and land side with small holes, and attaching to the back of the mould board a water reservoir and a piston and pump or other device for forcing water and air through the perforations, so as to lubricate the faces of the plow, and thus prevent the adhesion thereto of earth.

Mr. Auguste N. Verdery, of Atlanta, Ga., has patented an effective machine for thrashing the heads of standing grain and cleaning the grain by a blast produced by the thrashing mechanism. It consists in combining with a reel and a case, having mouth or inlet for the grain in the straw, a cylinder having teeth adapted to give a shear cut and gather the heads inwardly toward the middle of the cylinder.

Mr. James B. Taylor, of West Hurley, N. Y., has patented an improved machine for digging potatoes, and which may also be used for loosening the soil and destroying grass and weeds between the rows.

Mr. Joseph Lane, of Chicago, Ill., has patented a rolling colter for plows, which consists in combining with a mould board plow a rolling coulter made dished or concaved on the mould board side, whereby the straw, grass, and manure are not only cut, but are turned over so that they will be completely covered by the plow.

Mr. Jesse A. Kirkpatrick, of Cartersville, Ga., has patented a seed planter adapted for planting cotton seed and all kinds of smooth seed, such as peas, beans, corn, wheat, etc. The invention consists in the combination and arrangement of parts, which cannot be clearly described without engravings.

Correspondence.

On the so-called "Crystallization of Canada Balsam" and how to Make Ornamental Picture Frames.

To the Editor of the Scientific American:

In your last issue you publish an article by Mr. Geo. M. Hopkins, who, writing on the above in answer to a statement made by Professor Barker, holds that he does not "think that the beautiful arborescent forms are anything more than cohesion figures," in which he is right. Some years ago, when I was employed in a picture frame factory, one of the mechanics, a Mr. Jackson, who was working there with me, said he knew a German who used to make picture frames from glass, the process of which he tried to keep a secret, but which was captured from him by Mr. Jackson; and as I think it might be of some amusement and practical utility for some of your numerous readers if you publish the same, I will give you the process:

After having agreed upon the length and width of the frame, get four strips of glass, and after having cleaned them take one of these strips and pour some pure asphaltum, which has been dissolved in turpentine by heat, on the entire length of the strip; and if now you take another of the strips and lay it on the asphaltum, and then press the two strips together with your fingers, you can produce as many "ferns and cacti" as you please by holding the strips between you and the light. After having produced some of these "ferns and cacti," which you wish to retain, apply a knife between one of the ends of the strips and gently pull them apart and lay them aside, so that they may become hard or dry; now proceed with the remaining two strips in the same manner as described, care being taken to match the "ferns or cacti" as near as possible to the one on the two first strips. After having become hard or dry, apply any color or colors that you may fancy on the asphaltum, and let this also dry; then apply some thin composition smoothly with a knife over the colored parts of the strips, this composition being the same that they employ for ornaments for picture frames, etc. When this has also become hard, cut the ends of the strips with a diamond to the proper angle and length, and glue them on four strips of wood which are also of the proper angle and length, and nail them together; the sides of this frame may then be incased with gold or other mouldings.

F. E. FORSTER.

New York, February, 1880.

Fire from Steam Heating Pipes.

To the Editor of the Scientific American:

In respect to fire from steam heating pipes, the letter of Mr. Wm. J. Baldwin may lead your readers into very grave danger unless facts are stated that have come to the knowledge of the officers of this company.

It is alleged that "no one imagines they can light a stick against a boiling kettle, temperature 212°," which is perfectly true; but we have a specimen of wood reduced to charcoal by the heat of boiling water. It constituted a part of an open boiling kier in a bleachery. By long use the inside of this kier had become rough, nails were driven in half their length and cement put on, held by the nails, the heads of course being covered. In less than twelve months the heat carried into the wood by the nails carbonized it.

That charcoal may be inflamed by steam pipe has been proved to us by the fact that one of our members packed a steam pipe across a yard in a wooden box, filling in with fine charcoal as a good non-conductor of heat. Within twelve hours the charcoal was in a state of intense combustion.

A steam pipe was carried through a sill in a new hotel in Woonsocket, R. I., in contact with the wood; in less than twelve months combustion ensued. I have a partially burnt section of this sill, set up with the pipe as it was arranged.

We also have a portion of a factory beam partly burned by contact with steam pipe. Our vice-president found a steam pipe in contact with a floor; the floor was hot at the time it was cut away, and it proved that the beam had been on fire and the fire had gone out for want of oxygen.

We could give several more examples, but these will suffice. We assume that ignition takes place from slow chemical reaction after the wood has become carbonized, and under certain conditions favorable thereto, which may not often occur, but which have yet occurred so often within our knowledge as to make contact of wood with steam heating pipes one of the grave dangers which cannot be tolerated anywhere.

We have within our knowledge numerous examples of the lint of oiled wool, workmen's overalls, and other substances being set on fire by contact with steam heating pipes.

EDWARD ATKINSON,
President Boston Manufacturers' Mutual Fire Insurance Co.

How to Make Tight Tarred Paper Roofs.

Have the lower layer of paper that comes next to the boards without tar or dressing of any kind (*plain paper*), then over that three layers of tarred paper. When the tarred paper is laid on the boards of the roof it adheres firmly to the boards, and when they come to shrink (as they always do) the paper is torn at the joints between the boards, especially if wide lumber is used the fracture is greater. Plain paper does not adhere to the boards, and they are allowed to shrink or expand without damaging the roof. I have tried it and know that a roof put on in this way will remain tight more than twice as long as when the tarred paper is laid next to the boards, besides it entirely prevents the dripping of tar through the cracks of the roof in hot weather. The extra expense is a mere trifle, not 25 cents each square of 100 feet.

J. E. EMERSON.

Beaver Falls, Pa.

Captive Light.

A little reflection will show that if a means could be found for storing up light, as heat or electricity can be stored, the invention would be of almost infinite application. To discover means of this kind has been the aim of an English chemist, Mr. W. H. Balmain, formerly of University College, London, and latterly manufacturing chemist of St. Helens, Lancashire, for a period extending over forty years, and the results of his researches were protected in a patent No. 4,152, 1877, for "luminous paint." It is known that there are certain earths, such as the sulphides of lime and baryta, and some sorts of sea shell, which, on being exposed to the light for a time, become luminous in the dark, and apparently give out again the light which they have absorbed. Mr. Balmain's idea was to compound a paint of these substances which could be applied to the windows of rooms, the walls of streets, buoys, notices, clock faces, and a thousand other articles which require to be seen in the dark, so as to render them self-luminous. Owing, however, to the health of the inventor breaking down, no practical issues came of his invention until quite recently, when it was taken up in a spirited fashion by Messrs. Ihlee & Horne, of 31 Aldermanbury, London. A pioneer company has been formed to work the patent, and there is now an eager demand for the mysterious illuminant.

The exact nature of the luminous ingredient of the paint is kept a secret, but it is said to be wholly extracted from the common chalk of our cliffs. Probably it is the sulphide of calcium, and is prepared by mixing lime and sulphur in certain proportions. The paint can be made with oil or other transparent liquid, according to the purpose for which it is designed. The physical nature of the storing process appears to be that the waves of light breaking upon the molecules of the sensitive salt start them into vibration, and this vibration continuing long after the motive light is withdrawn, sets up a succession of ether waves which affect the eye as light, much in the same way as the blow of a bell clapper gives rise to waves of sound. A sensitive surface of the paint exposed to daylight, or the more powerful beams of the magnesium wire or electric arc for a sufficient length of time, will continue to emit light for four or five hours after. Of course the "stored" light grows fainter as the time grows longer.

We have made several experiments with a specimen of the luminous paint supplied us by Messrs. Ihlee & Horne on a piece of cardboard. After exposure to the sunlight of a window for a few minutes when taken into a dark place it is seen to glow with a violet luster, which is whiter as the darkness increases, or according as the exposure is lengthened. An amusing optical delusion can be performed with it. A half crown is placed on the painted surface before it is exposed to the light and kept there the whole time; when the latter is taken into the dark room or closet, the coin is withdrawn. Nevertheless its position is distinctly marked by a black disk surrounded by the luminous field of the paint, and it is easy to make any unsuspecting individual mistake the sham shadow for the substance. We call it a sham shadow because it is really the ghost of a shadow, that is, a shadow which exists after the body which occasioned it has disappeared.

Much interest has recently been excited in the product, and many applications of it are proposed. Clocks with dials rendered self-luminous in this way have been some time since introduced by another maker from France; but we understand that a royalty is paid on these to the proprietors of the English patent. The Lords of the Admiralty have been making experiments with it in a darkened room at Whitehall, and have expressed themselves in favor of it for lighting up the compartments of ironclads, or for the powder magazines; and two compartments of H.M.S. Comus have been ordered to be painted with it. For life belts and buoys, it will of course be an acquisition in rendering them visible by night. A lantern capable of enabling a person to read or work in the dark can be made by framing a few square feet of painted surface; and the superintendent of the West India Docks has ordered lanterns for use in their dangerous spirit vaults. The virtues of these lanterns in explosive mines, petroleum stores, and cellars, are too obvious to be dwelt upon. Mr. Towers, who has just supplied the German Navy with his speed indicators, and is now engaged in adapting them also to several English war vessels, notably H.M.S. Northampton, has decided to have the dials of his apparatus illuminated in this way so as to enable seamen on the darkest night to read the index. Mr. Hollingshead, the enterprising manager of the Gayety Theater, is in treaty to secure the sole right to apply the paint in the production of theatrical effects; and it is probable that the process will soon come into conspicuous use as a medium for advertisements.—*Engineering.*

Professor Tyndall's Christmas Holiday Lectures.

On the 8th January Prof. Tyndall, D.C.L., F.R.S., delivered at the Royal Institution, Albemarle street, Piccadilly, the last of this year's Christmas course of "Six Lectures for Boys and Girls on Water and Air." As the lecturer explained at the outset, he confined his attention in what he said of air to its physical properties, and had no intention of entering upon its chemical composition and relations. Torricelli's grand demonstration of the existence and weight of the atmosphere, verified by Perrier's experiments, as suggested by his brother-in-law, Pascal, which proved that the mercury fell in the Torricellian tube as the Puy de Dôme was ascended, was soon followed by his invention of the air pump. It had been claimed for the illustrious Robert Boyle that he greatly improved that instrument, and made with it a great number of important experiments. He saw clearly the condition of the lower strata of the atmosphere, pressed upon as they were by the strata above them. He compared the air particles which sustained this pressure to little corpuscular springs, which cause the air to expand when it is relieved from pressure. Five weeks' continued observation showed him the variation in the height of the barometric column, on which we now base our predictions regarding the weather. He made numerous observations on the influence of atmospheric pressure on the boiling point of liquids.

To Hawkshee is generally ascribed the merit of proving, in 1705, that sound cannot pass through an air pump vacuum; but in a letter from Beaconsfield, dated December, 1659, Boyle described an experiment which proved the same thing. The ticking of his watch he found was extinguished in his exhausted receiver. Boyle imagined, and the notion had even been prolonged to our own time, that the strong adhesion together of two smooth surfaces was caused by the pressure of the atmosphere. That this was an error had been proved by a perfectly conclusive experiment which Prof. Tyndall repeated before his audience, as he had already done in the instance of Boyle's most important ones. Two Whitworth planes were placed *in vacuo*, when it needed as great a force to pull them asunder as that requisite in the open air. Boyle examined the influence of atmospheric friction on a vibrating pendulum. He also made experiments with his air pump on living animals. He put flies, bees, caterpillars, snails, birds, mice, and fish under his receiver, and observed the effect upon them of removing the air. Experiments were also made upon dogs, and the result of his labors was "the lifting of his heart in pious gratitude to the Creator for having made the air so admirably subservient to animal life and enjoyment."

In answer to an attack by the philosopher Hobbes, Boyle wrote his "Defense of the Doctrine touching the Spring and Weight of Air," in which he describes "two new experiments touching the measure of the force of the spring of air compressed and dilated." These two experiments establish with the utmost rigor a law which for generations was ascribed to the philosopher Mariotte. In establishing this law, Boyle omits no precaution necessary to insure exactitude. He worked with a bent tube having a short closed arm and a long open one, compressing the air in the short arm by mercury poured into the long one. In five and twenty different experiments he found that the density of the air was exactly proportional to the pressure exerted upon it, or, as Boyle expressed it, that "the pressures and expansions (volumes) are in the reciprocal proportion." He proved this law true for air at pressures less than that of the atmosphere, as well as at pressures greater than that of the atmosphere. The law of Mariotte should therefore unquestionably be called the law of Boyle. Professor Tyndall having explained the bubbling in the ears felt as we climb a mountain, and shown how it may be stopped by swallowing, remarked further how useful Boyle's poetical expression "the spring of air," is in clearing up such experiments as that of the Cartesian diver, the phenomena of Rupert's drops, and the play of such fountains as depend on the pressure of the atmosphere. The fire engine was also worked by the same agency, and upon it depended the action of the hydraulic ram. In illustration of the power of hydraulic pressure, carbonic acid gas was liquefied before the audience. It was further shown that by it Sir Joseph Whitworth's fluid-compressed steel was not only produced but tested, until at last it withstood a pull of more than a hundred tons on the square inch. Hydraulic pressure, combined with the action of glaciers, had even, as was proved by a working model, produced the "parallel roads" at Glen Ray, in the Highlands, which had so much astonished all who had traveled in the Ben Nevis country.—*London Times.*