THE Pittsburgh *Republican* states that at Rising Sun, Ind., on the Ohio river, on the 14th of July, while the sky was perfectly clear so far as the eye could reach, and the sun was shining brightly, a vivid flash of lightning appeared, followed by a long and sharp peal of thunder. The electric fluid struck a church and three dwelling houses. At the same instant a little girl was killed outright, and a little boy had his clothing stripped completely off his body, not excepting his shoes, all of which had the appearance of having been cut with a sharp knife. The boy was only stunned and slightly injured in one of his legs. Another boy in the same vicinity was also struck at the same time, but was more seriously, although not fatally, injured than the boy who had his clothes torn off.

AN interesting experiment has been made on Mont Cenis, in presence of the Minister of Public Works, in France, who accompanied the chief director and several engineers. The part of the railroad already completed, which ascends by a winding inclined plane, was traveled over by a train composed of several carriages at a speed of about 11 miles an hour ascending, and 15 descending. The highest gradient was 8½ per cent, and several curves were at an angle of only 40 degrees. The works on the Italian side are to be finished by the end of next October, so that it is expected that by next November Italy and France will be united by an unbroken line of iron.

SOME French *savant* has been writing about plants having green and white blood. When he gets through with these important researches we hope he will be able to find out whether or not the moon is made of green cheese or *Schweitzer kase*. He may be able to prove the fact that the moon is the Dutchman's heaven.

RECENTLY an eruption of an artesian well took place in a garden adjoining the church of St. Agnes, in Venice. The walls of the church were cracked in all directions. The substance vomited consisted of black ashes and a suffocating gas, the expansion of which is supposed to have caused the outbreak. The water which was thrown up reached as high as the top of the church.

THE body of an Australian native, which was found in a state of petrifaction, has been sent to England. This singular specimen was found in one of the limestone caverns which abound in the plains of Mosquito, in the south of Australia. The body was discovered in the natural position of a sleeping person.

FALL RIVER is growing rapidly from the great increase in manufacturing. When the mills now in process of erection are completed, it will have more spindles than Lowell, and be the first city in America in the amount of cotton and woolen goods manufactured. A large part of the machinery is moved by steam.

ON Tuesday, the 7th inst., ninety-two patents were ordered to issue to inventors whose applications were prepared at the SCIENTIFIC AMERICAN Patent Agency.

NEW INVENTIONS.

The following are some of the most prominent of the patents issued this week, with the names of the patentees :—

CHILDREN'S BED-CLOTHES RETAINER.—M. L. THOMPSON (assignor to himself and E. L. CHILDS, 189 President-street, Brooklyn, N. Y. Patented November 28th, 1865).—Much annoyance and trouble is given to mothers and nurses by children constantly getting uncovered at night, owing to their restlessness. Their feet or hands are almost constantly in motion, and it is impossible to keep children covered unless they are continually watched, and if neglected they become uncovered, and serious colds are often the result, especially in the spring and winter seasons, which often develop into some ailment fatal to the child. The object of this invention is to produce a simple means for retaining the bed-clothes in place over the child, no matter what position it may assume, and for this purpose a ring or collar of suitable construction is employed, which is to be placed around the child's neck, and to which the bed-clothes are attached.

COFFEE ROASTER.—H. B. MASSER, Sunbury, Pa.—The object of this invention is to obtain a simple, portable, and economical device for roasting coffee, one which may be manipulated with the greatest facility, both as regards the stirring of the coffee while being roasted and the removal of the same, when roasted, from the device.

FAN MILL.—CHARLES K. EHLE, Greenbush, Wis.—By means of this fan mill, which is simple in construction, strong and durable, the wheat may be easily and rapidly freed from oats, straw, and chaff, and. at the same time, it answers every purpose for cleaning all other kinds of grain.

GRAIN CLEANER.—C. F. BAYLER, Clinton, N. J.—This invention relates to a device for clearing grain which consists in the use of a reciprocating screen operated in a novel way, whereby cockle and shrunken grain are separated from the sound grain in a thorough manner.

DEVICE FOR HOLDING STAPLES WHILE BEING DRIVEN.—ALBERT C. BETTS, Troy, N. Y.—This useful device is for holding staples and is designed to facilitate driving them, and it is more particularly applicable to the making of wire fences where the wires are secured to the posts by means of staples.

GANG PLOW.—WILLIAM BATTTLL, Quincy Ill.—This invention consists in a peculiar construction and arrangement of parts whereby lightness of draught is obtained, and the plows rendered capable of being manipulated with the greatest facility, while simplicity of construction prevents any of the parts getting out of repair or working order.

PROPELLER SCREW.—WM. E. DAVIS, Jersey City, N. J.—This invention consists in an improved mode of constructing screw propellers for steamships, by forming them of separate blades of boiler iron, fastened with screw bolts on the shaft, making the propellers much stronger, lighter, and cheaper than when cast, connected in one piece, as usual. If a blade is broken, even at sea, it is easily replaced.

FORGING PISTOL AND RIFLE FRAMES.—CHARLES E. BILLINGS, Windsor, Vt.—This invention relates to the forging of pistol frames, and consists in subjecting the blanks to a series of dies of suitable shape therefor.

TWEER FOR BLAST FURNACE.—JOHN BAYLISS, New York City.—This invention consists in a novel arrangement of the air blast, whereby combustion is increased and also the amount of heat generated.

TRAVELING BAG.—NICHOLAS GROEL, Newark, Essex County, N. J.—This invention particularly relates to the traveling bag frames, and its object is to strengthen the two jaws of the frames at the points where they are hinged together.

PICKER MOTION FOR LOOMS.—HOSEA ELLIOTT, Globe Village, Mass.—This invention relates more especially to power looms, and it consists principally in throwing the shuttle independent of the cam shaft, so as to secure a uniform pick motion whatever the speed of the shaft may be.

FENCE.—WM. H. BROWN, Stockwell, Ind.—This invention consists of the combination of connecting blocks and inclined corner stakes or braces with the panels of the fence, and in the combination of long poles or rails and stakes with each other, and with the panels of the fence.

FLOUR BOLT.—J. C. BLYTHE, Perry, N. Y.—By means of this invention flour may be bolted faster and more evenly than with the bolts now in common use. It consists in combining round hoops with the arms, ribs, and cloth of a flour bolt, in such a way that a space may be left between the ribs and cloth between each pair of hoops, so that the flour may be in contact with the cloth all around the bolt.

SAW SET.—JOHN LYLE, Newark, N. J.—By means of this improvement a saw may be set much or little, without the possibility of warping the blade or setting the teeth untrue.

GANG PLOW.—SAMUEL HUTCHINSON, Griggsville, Ill.—This invention relates to an improved means for regulating the depth of the penetration of the plows, and also to a means for raising and lowering the plows and retaining them in the ground when the device is at work.

SPOKE TENONING MACHINE.—OLIVER VANORMAN, Ripon, Wis.—This invention has for its object to furnish an improved machine for thinning and tapering the tenons of carriage wheel spokes.

FRUIT GATHERER.—S. MELLINGER, JR., Mount Pleasant, Pa.—By this invention a fruit gatherer is produced, which can be used with the utmost ease and rapidity, and without injuring the fruit.

WOOD-SAWING MACHINE.—JAMES D. MATTHEWS, Bowling Green, Ohio.—With the wood-sawing machine embraced in this invention a great economy both of time and labor is effected, the machine being simple in construction and effective in operation.

SIDE SADDLE.—CLARA A. BARTLETT, Oakland, Cal.—This invention consists in so attaching one of the horns of the side saddle to its tree or frame that it can be dropped down into such a position as to allow to rider to mount or dismount with the greatest facility and ease.

WASHING MACHINE.—ALBERT JOYNER, Elton, Wis.—This invention consists in a removable fluted or grooved concave, having perforations through it for permitting the water to rise underneath the clothes which are being washed.

MACHINE FOR DRILLING ROCK.—R. A. THOMAS, Damascus, Cal.—This invention consists in an improved machine for drilling rock, being especially adapted for tunneling through slate-bed and other similar descriptions of rock.

CALORIMETER.—C. W. GOPELAND, New York City.—When the size of the boiler tubes is too large, an unnecessary amount of fuel is consumed, and it is common to insert thimbles in the ends of the tubes to reduce the draft. These thimbles prevent the convenient cleaning of the tubes, and also arrest the ashes. In the present improvement the thimble or calorimeter is made in the form of a half moon, and occupies the upper portion of the tube end, thus reducing the draft, and holding the heated gases in the upper part of the tubes, but presenting no obstruction to arrest ashes or interfere with the cleaning of the tubes. An excellent improvement.

DEVICE FOR MARKING GROUND FOR PLANTING CORN.—PRESTON MCQUAID, Wenona, Ill.—This device is for marking off ground for planting corn in check rows, and it consists of three wheels placed at a suitable distance apart, within a proper frame, and the central wheel arranged or applied in such a manner that it may rise and fall to admit of the several wheels accommodating themselves to the inequalities of the ground over which they may pass.

LOG-SETTING DEVICE FOR CIRCULAR SAW MILLS.—J. A. GRIGGS, Charleston, Ill.—By this device logs may be set to a circular saw, by the sawyer himself, without the aid of an assistant. It consists in setting the log by means of a bar or handle passingover the log and saw, and within convenient reach of the sawyer.

HYDRAULIC MAINS FOR GAS WORKS.—J. N. STANLEY, Brooklyn, N. Y.—The object of this invention is to cast the upper parts of the tubes leading to the hydraulic main with one side of the latter so as to communicate with the main below the level of the fluid therein, whereby the gas, when it escapes up through the fluid in the main, has a free, unobstructed passage in the latter above the fluid.

HOT AIR FURNACE.—HENRY WHITTINGHAM, New York City.—This inventor has three different patents on hot-air furnaces. One relates to a hot-air furnace, the combustion chamber of which is surrounded by an air chamber, to which air is admitted from below, and through which extend a series of vertical and horizontal flues, the vertical flues to conduct the cold air to the horizontal flues, where the same is heated, and whence it passes into a hot-air chamber to be distributed to the various rooms or compartments in a building.

TYPE-SETTING MACHINE.—CHARLES BAER, New York City.—This invention relates to a machine in which one type after the other, as indicated by the pressure of the hand on suitable keys, is taken from a series of radiating type cases by a receiver, which is secured to a vertical shaft, on which it revolves, and which is so arranged that its end sweeps past the inner ends of the radiating type cases. The line of types in each case is subjected to the action of a pusher, which has a tendency to force the same toward the center of the axis on which the receiver revolves, and said columns are retained by spring hooks, which catch over the edge of the first type in each type case, and which connect with the key in such a manner that by depressing the inner end of one of the keys the corresponding spring hook is raised and a type passed out of the appropriate type case into a small chamber, from which it is taken by the revolving receiver. Suitable cams on the inner ends of the type cases serve to push the type into the revolving receiver far enough to enable a spring hook to catch hold of them and retain them, and similar cams on the end of the revolving receiver retain the line of types in the type cases, while that type which, by the pressure on the key, has been allowed to detach itself, is taken off by the revolving receiver.

NECK-TIE HOLDER.—THEODORE ROSENTHAL, New York City.—This invention relates to a device intended to fasten scarfs, butterflies, and neck-ties in general, to the upper shirt button, by means of two curved spring jaws, which project from a spring or plate to which the neck-tie is secured, the curved jaws being so shaped that they can be sprung over the shank of the button, and that they clamp the same tightly, so as to prevent the neck-tie becoming disengaged spontaneously.

WASHING MACHINE.—ADOLPH T. KULHMANN, Glenhaven, Wis.—This invention relates to a washing machine which is so constructed that it soaps the clothes, boils them, washes them, and wrings them; and which, after the washing has been finished, can be used as a table.

BOX FOR COLLECTING FARES IN OMNIBUSES, ETC.—J. B. SLAWSON, New Orleans, La.—The principal object of this invetion is to arrange a box for collecting fares, so that it is adapted for currency as well as for coin, that the fare deposited in the box can be seen by the driver as well as by the passengers; and furthermore, that the possibility of withdrawing from the box a portion of the fares deposited therein is absolutely prevented.

COMPOUND FOR GRINDING AND POLISHING.—N. A. BUHLE, New York City.—This invention relates to a compound which, when formed in rollers or bars, can be used with great advantage for grinding and polishing articles of metal of any desired description.

WASHING MACHINE.—WILLIAM M. DOTY, E. P. DOTY, AND ELLIS DOTY, Janesville, Wis.—This invention consists in the use of a spring wound on each of the fulcrum pins of the oscillating washboard, with its ends extending from the fulcrum pins in opposite directions, one to bear on the edge of the tub, and the other under a pin projecting from the bracket which forms the bearing for the appropriate fulcrum pin, so that in depressing the handle each spring is wound up and the pressure on each fulcrum pin is balanced, one end of the spring pressing up and the other down, and said pins are prevented from wearing out. It consists also in combining with the washboard, flanged segmental cheek pieces, which are grooved to receive the handle, and so formed that they prevent the water from splashing out over the ends of the tub; and also in the arrangement of cleats on the ends of the tub, in combination with the upper ends of the legs, which are secured to the tub, each by one screw, in such a manner that the end pieces of the tub are free to expand and contract without being liable to crack, and at the same time the legs are firmly held in position.

NEW PUBLICATIONS.

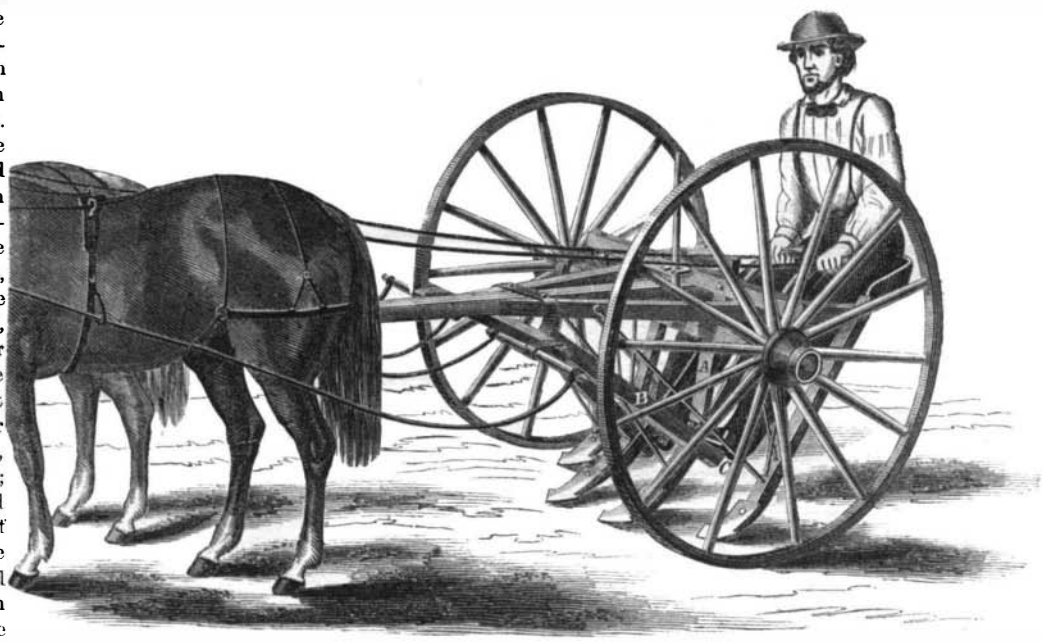
THE TURNER'S COMPANION—Containing Instructions in Concentric, Elliptic, and Eccentric Turning, with illustrations. Henry Carey Baird, 406 Walnut street, Philadelphia.

There is much in this volume of interest to amateurs, and some of value to practical workers. The suggestion of the author, in his preface, that the foot lathe is a proper machine for the use of "the sex," we regard as timely and felicitous. There is no adequate reason why women should not use the lathe as a means of exercise, and, at the same time, an agent for the production of beautiful geometric forms, pleasing to the eye, and of practical utility. For some of the plates we have not much that is commendatory. The representation of circles in perspective, by well-defined lozenges, violates all rules of art, and the handles of tools, made in accordance with the illustrations, would be anything but "handy" and convenient. Despite these drawbacks, however, the volume will be found to be a useful adjunct to the *repertoire* of the amateur, and of value to beginners, and some of the recipes are just what is needed, furnished in a convenient form.

Improved Corn Cultivator.

Quite recently we ran up through the valley of the Mohawk River, where vast fields of corn are grown, and side by side, scarce twenty rods apart, were two men at work; yes, two men and one woman. One man had a cultivator, and as he drove he turned over the shining soil against the growing crops, and rode as he drove. The man and woman bent to their work, he earnestly, she in a stiff, ungainly way, as might be expected of a woman in an employment unsuited to the sex. The contrast between the two methods was too marked not to be noticed, and we wondered how any man could be so short-sighted as to use manual labor where machines are provided which will do better work than he can, in half the time.

In this engraving we illustrate a simple and efficient cultivator, which has met with much popularity at the West. There is no machinery about it, and any one that can drive can manage it. In brief, the axle has a triangular frame fixed to it, on one end of which is the draft pole, and on the other two vertical beams, A, which carry the plows, B; the cultivators attached to the plow beams are of any desired shape. The plow beams are so fixed as to be readily moved in any direction, and are capable of being easily guided between the rows. This is accomplished either by grasping the handles, as seen in the engraving, or by placing the feet on stirrups on the plow beams. In this way a vast amount of work can be done in a satisfactory manner, and the cost will be much less than by hand labor.



STOVER'S CORN CULTIVATOR.

It was patented February 27, 1866, by Andrew T. Stover, of Sandyville, Iowa.

RAIN GAGES AND RAIN FALL.

Scarcely a day passes in this section of the country but that cooling showers descend during the night, refreshing the earth, parched during the day by the glaring sun. This moisture, returned in the form of rain more rapidly than it was abstracted, is generally the result of the union of two or more volumes of humid air, differing from each other in temperature. When mingled in the mass, or rather cloud, it is incapable of retaining the same amount of moisture that each did separately. If the moisture is over-abundant it descends in showers; if but slight, it floats in the air as a cloud, and long before showers fall we see masses of vapor skurrying before the wind until all are mingled in one.

The average yearly rain fall varies greatly, being the most in the tropics. As a general rule, the higher the average temperature of a country, the greater will be the rain fall.

In tropical countries the average amount is 95 inches, in the temperate zone but 35. In hot countries the heaviest rain storms occur when the sun is at its greatest altitude, but the reverse is the case in the temperate zone, where dry summers are by no means exceptional, and long wet winters hold sway.

In many parts of the world it never rains, and the arrowy sheets of water, driving before the wind, are unknown; in others there are certain rainy seasons when the heavens open and the floods descend and cover the earth as of old.

The Island of Chiloe, and the country about the straits of Magellan are said to be the wettest places on the face of the globe. There it rains incessantly. In the northern part of the United States there are, on an average, 134 rainy days in the year; in the South not so many numerically, but the average rain fall is greater.

At San Luis, in the island of Maranham, the average rain fall is 280 inches, which is the greatest on the continent.

The quantity falling in a given time is measured by a gage. A common form of this instrument is a can with a floating piston and rod; as the rain falls it raises the piston, and the quantity is known by observing the graduations on the rod.

A better instrument is made by attaching a small tube to the side of a larger one, the two communicating at the bottom; the lesser being graduated shows the quantity which falls in any given time very clearly. Experiments made by the Smithsonian Institute show that a tube 6 inches long and 2 inches in diameter, connected with one half the diameter, gave the best results; a funnel-shaped plate inserted at the top improves it.

HOLT AND THOMPSON'S IMPROVED OILER.

In our issue of July 28th we illustrated a device, patented April 24, 1866, for preventing the oil from smearing the outside of the oiling can. We herewith present another form of the oiler, intended to maintain always an upright position. It can be used either with or without the globe-valve attachment, shown at A, which was fully described in the number referred to. The can is made of sheet brass,

silver plated, for the sewing machine, and weighted at the bottom, as at B, to bring it to an upright position when accidentally overturned. This is further assured by the form of the can. For common purposes the oiler can be cheaply made by constructing the lower section, from the line, C, of cast iron, thick as seen at D and B, which would further insure steadiness of position by increased weight.

Further information in regard to this neat contrivance can be obtained by addressing J. M. Thompson, 2d, or G. L. Holt, Box 1,058, Springfield, Mass.

PROTECTING BUILDINGS AGAINST LIGHTNING.

In our last issue we had an article on this subject but it did not exhaust the topic. We desire to say a few words additional in relation to ordinary protection against lightning.

Many buildings are now constructed, both in the city and in the country, with metallic-covered roofs, and very few are erected without metallic eaves troughs and conductors. In all such cases the efficiency of lightning protectors is impaired by the preponderance of conducting surface on the roof and down the sides of the building. This metallic covering, and these rain conductors, whether of tin, zinc, or lead, are better conductors of electricity than the building of stone, brick, or wood, and should be utilized as a means of protection against lightning. For this purpose strips of iron, zinc, or copper should connect the lower extremities of the water spouts with the damp earth, a well, or a running stream of water, and the eaves troughs should have a connection with the metal roofing and with the vertical conductors. Water is a good conductor of electricity, and when, in a thunder storm, the rain is pouring down the conduits of a building, their conducting properties are largely increased. Properly connected, these useful appliances can be made doubly valuable as harmless conductors of electricity.

In cities and enterprising towns there are systems of water pipes and gas conductors, of metal, ramifying in the interior of dwellings and other structures. Such buildings should be carefully protected outside. If the conducting medium, whether of water or gas pipes, preponderates in the interior of the building, the electric fluid may leave the external conductor and through a thick wall seek that which facilitates its passage to the earth. In such cases it seems that nothing but a rod, having numerous points for collecting the electricity and adequate means of conveying it innocuously to the earth, would be an effectual protection. Some authorities recommend a connection to be made between the system of water and gas pipes inside a building and the external conductor.

The question of insulation seems to be a disputed one, some insisting on thorough insulation of the rod, by means of a non-conducting substance interposed between it and the building, and others as strenuously maintaining its uselessness. It would seem to be unnecessary, if the conducting capacity of the protecting rod is greater than that of the building itself; and this, after all, is the most important requisite for a protector against the ravages of lightning.

THE *Mahroussee*, built by Samuda, designed by Lang; oscillating engines by Penn; obtained the greatest speed on trial trip ever known, viz., 21½ statute miles an hour. Length, 360ft.; breadth, 42ft.: depth, 29ft.; wheels, 33ft. diameter; tunnage, 3,141; horse-power, 800.—*Engineer*.

[This is in England. Our North River boats have frequently made 26 miles an hour. The *Chauncey Vibbard* ran from New York to Albany, 160 miles, in six hours and forty minutes. In deep water she averaged 24 miles an hour.—EDS.

A SINGLE establishment in Waterbury, Conn., uses 1,500 tuns of copper annually in the manufacture of pins, hooks and eyes, and other similar articles.