

seven pieces of apparatus: 1. Barometer; 2. Dry and wet metallic thermometers; 3. Sun thermometer; 4. Instrument for recording the direction of wind; 5. Instrument for recording the velocity of wind; 6. Instrument for recording the force of wind; 7. Rain gauge.

For the most part these instruments can be fashioned and set up by any bright boy; and we can imagine no occupation more agreeable and profitable during these long winter evenings, or the leisure days which are so common in winter, than their construction and erection in the garret, the barn, or the shop-loft. There certainly can be no more direct or enjoyable method of beginning the study of the fascinating and always profitable science of the weather. If the student has any mechanical skill the simple clock-work employed in some of the pieces of apparatus can be easily made; the cheap machinery of a "dollar clock" can be purchased almost anywhere by such as do not choose to attempt this part of the work. In each case the method of making and using the instrument is given with such minuteness of detail that no intelligent person need be afraid of undertaking the practical study of meteorology by means of them, making if he will every part of his observatory. A very little daily attention thereafter will make the intelligent possessor of such apparatus weather-wise beyond the wildest imagination of the old-fashioned oracle, even though he be the much-quoted "oldest inhabitant."

It may serve as an encouragement to those who may contemplate the practical study of the weather by the means indicated, to say that the inventor of the apparatus described made with his own hands the several pieces he employs; and that by their use he has made the New York Observatory, though housed in a little garret room at the top of the old Arsenal building in Central Park, one of the most efficient meteorological observatories in the world. It is to be hoped that the construction of a new building for his use on some elevated part of the park, where instruments can be placed for the taking of sun spots, earth magnetisms, earth temperatures, and so on, may not be longer delayed.

**TRADE MARKS IN CONGRESS.**

The proposed constitutional amendment giving Congress the power to grant, protect, and regulate the exclusive right to adopt and use trade marks was reported back from the Committee on Manufactures, December 17, with their unanimous approval, and referred to the Committee on the Judiciary. The Committee on Manufactures expressed a strong desire that the resolution might be agreed to by Congress early in the session, that the amendment might be submitted to the State legislatures in session this winter, as a number of them would not meet again for two years.

The committee urge the necessity of protecting trade marks for the benefit of purchasers, as well as for the encouragement of manufacturers. They insist, also, that the control of the matter should be vested in Congress. Trade marks are not and cannot be confined to State lines; and the treaty-making power, of which this has become an incident, is one solely within national control. The fact that other nations—Great Britain, Germany, France, Belgium, Spain, Russia, and others—have made trade marks a subject of national interest, is further urged as a reason for our following their example.

Undoubtedly a wisely drawn national trade mark law would greatly simplify the regulation of trade marks, and in many ways be a benefit to trade. It is obvious, however, that a law presenting the obnoxious features of the one now declared unconstitutional would not and should not so meet the approval of the several States as to induce them to surrender to the general government their reserved rights in this matter.

The provisions of the law of 1870 with regard to the fraudulent use or counterfeiting of trade marks were quite sufficient. The party misusing a trade mark was made liable to an action for damages; and the party aggrieved was entitled to have his remedy according to the course of equity to enjoin the wrongful use of his trade mark and to recover compensation therefor in any court having jurisdiction over the person offending. In 1876 Congress saw fit to pass an act for the special punishment of trade mark offenders, which put the matter on an entirely different footing. It provided a maximum fine of one thousand dollars or two years' imprisonment, or both, for offering for sale goods bearing a fraudulent trade mark; for affixing such a mark; for putting up packages bearing such a mark; for manufacturing such a mark, or having in possession the means employed in such manufacture, such as dies, brands, engravings, or the like; for in any way dealing in or having in possession any representation, likeness, similitude, copy, or colorable imitation of any private label, trade mark, or the like; for having in possession any used or empty box, envelope, wrapper, case, bottle, or other package to which is affixed a trade mark which might have been obliterated but had not been, so as to prevent its fraudulent use.

The power which such provisions put into the hands of vindictive men to harass or injure their rivals was as unjust and as unreasonable as the punishment provided was excessive. But this was not the worst feature of the law. In one sentence—three yards long, carpenter's measure—section 7 provided that if the owner of any registered trade mark or his agent were to make oath that he had reason to believe that any one was offending in any of the particulars given above, either of the judges of the Circuit or District courts of the United States, or the commissioners of the Circuit courts, were empowered to issue search warrants directing

the United States marshal for that district to invade the suspected party's premises and seize any suspected article—as, for example, an empty match box or gin bottle bearing a fraudulent trade mark, or a genuine mark which might have been but was not obliterated. And any one who should knowingly aid or abet any one in violating any of the provisions specified was, in section 8, made liable to a fine of five hundred dollars, one year's imprisonment, or both.

It is safe to predict that the legislatures of the several States will be little likely to put it in the power of Congress to repeat such enactments, even should the proposed amendment to that effect be favorably considered by the Houses now in session.

A more favorable method of securing all that is necessary with regard to the national registry and protection of trade marks is offered in Mr. Caswell's bill, introduced in the House, December 15. This bill embodies the idea set forth by Mr. Bartlett in our issue of last week, namely, that the Commissioner of Internal Revenue be empowered to furnish at a nominal price, to such as may desire the incidental protection thereby afforded, a special revenue stamp, to be known as a trade mark stamp, the fraudulent use or counterfeiting of which would be punishable after the manner of other offenses against the revenue laws. The objections to this method were sufficiently stated by us last week. Its advantages are obvious, not the least of which is the simplicity of its working and the absence of any necessary surrenders of State rights to the general government.

The disposition to hurry the action of Congress in this matter, manifested by the Committee on Manufactures, is much to be deprecated. The existence of State regulations substantially protecting the rights of manufacturers in the matter of trade marks largely removes the alleged urgency of the case, so that immediate action is not so much needed as a permanent and practical settlement of the question on a basis of justice and sound policy. The advantages of the trade mark system are not so great as to warrant any invasion of the just rights and privileges of the people to secure them.

It must not be forgotten that the theory of the protection of purchasers by trade marks, so strongly urged by the committee on manufactures, holds good only so long as the owners of trade marks choose to maintain the original quality of the wares in connection with which the marks acquired their value. But the public have no guarantee that such will be the case, or that the confidence they repose in any mark may not be grossly abused by the original owner or some subsequent purchaser of it. Practically, therefore, the benefit arising from the protection of trade marks accrues chiefly if not entirely to the owners of them. If trade marks were granted only in cases of positive superiority on the part of the wares to be marked, as a sort of reward of merit for real excellence, their influence so far as purchasers are concerned would be vastly different; and the standing of the trade mark owner, before the people would be to some degree comparable with that of the patentee. As the matter stands there can be no comparison between them. As a rule, neither the trade mark nor the thing marked adds anything new or valuable to the common stock either of useful ideas or material goods. Yet under the old law, as we have seen, a greater degree of protection was accorded to the owner of a trade mark than to the owner of a patent for invention; a national cheapening of the value of original and useful ideas that should be avoided in future legislation. It is neither just nor politic to place the man who, originating nothing, simply appropriates for his own use something from the common stock of words, phrases, or forms, on a higher level before the law than the man whose thought and labor had created something of public benefit through the advancement of the useful arts.

Under proper restrictions a national trade mark law, as already said, might be desirable. The matter, however, should not be over-hastily considered, either in Congress or in the State legislatures, should it be referred to them. And the subject should be treated with especial caution at this time, when public sentiment is so ill-disposed toward anything partaking of the nature of monopoly, or looking like an unnecessary surrender of rights and privileges either to the national government or to individuals.

**A DISSERTATION BUREAU.**

About eight years since considerable commotion was created at home and abroad by a published statement that a certain legally chartered medical college in Philadelphia was selling degrees. The rumor proved true, and the institution was suppressed. It is, however, a fact that at that very time one of the smaller German universities was conferring degrees upon men who had never seen a German university, without even the formality of their visiting that country, much less of submitting to an examination. Bad as this was, the said institution required, as nearly all German institutions now do, an original investigation, the results and details of which were to be presented in the form of a dissertation.

Recently Berlin has been greatly disturbed by the discovery in that city of a large dissertation factory conducted by one Doctor (?) Rosenbaum, who also gave private lessons and coached candidates for examination. The authorities have succeeded in securing the books and correspondence of this curious establishment, and found that it had been widely and extensively patronized. Strange as it may seem, the dissertations furnished were not merely articles copied from an encyclopedia, but really scientific productions,

showing that brains and talent were engaged in this nefarious swindling scheme. The charge for a doctor's dissertation was only \$112.50, while small papers were furnished for \$37.50. Every profession was represented, for the bureau supplied dissertations in jurisprudence, medicine, philosophy, history, philology, and theology. Owing to the judicial investigation now in progress many details are withheld for the present. It is thought that an investigation will result in degrading a number of persons who have gained their promotion by virtue of these false papers.

The discovery of so deep and dangerous a plan of systematic educational swindling among the honest Germans should lead them to be more lenient toward us for our sharp Yankee tricks and incite us to suppress our own factories of bogus or worthless degrees, that we may be more blameless than vaunted Germany. Our medical colleges especially should be closely watched in the matter of giving degrees. The title, too, of professor, should be more sparingly applied to second rate teachers, and made to mean something.

**INFLUENCE OF ELECTRICITY ON VEGETATION.**

Some months ago, says *La Nature*, M. Grandeau, director of the agricultural station at Nancy, announced that experiments made upon Indian corn and tobacco proved that atmospheric electricity exercises a very favorable influence upon vegetation. M. Maudin, director of the National Botanical Garden of Antibes, to-day makes known some facts which go to prove directly the opposite. He experimented on other plants, and in another climate; and, as will be seen, he draws the conclusion that M. Grandeau's inferences were too general. According to him, atmospheric electricity, like all other agents of vegetation, plays a useful part, but which, in its absence, can be replaced by another force. The experiment was made in the following manner.

In a kitchen garden bed well exposed to the light, two squares of 51 decimeters each were selected at 7 meters apart, and in each of them was planted a bunch of dwarf kidney beans, a lettuce, a tomato plant, and two cotton seeds. One of the beds was left to itself, and the other was covered with an iron cage, the four uprights of which terminated in points to attract all of the atmospheric electricity. For a fortnight the two cultures appeared to be alike; but at the end of this period, a difference was observed between them, and the difference, which was to the advantage of the cage, kept increasing more and more. The bean plants under the cage were much better developed and much richer in seeds than those in the open air. As for the lettuce, its height in open air was 1 meter, and under the cage, 1.20 meters; its total weight was 337 grammes in the open air, and 427 grammes under the cage. The tomato plant in the open air had attained a height of 0.8 of a meter, and under the cage, 1 meter; its weight in open air was 0.072 of a kilogramme, and under the cage, 3.754 kilogrammes. While under the cage the plant bore 83 tomatoes, weighing 2.162 kilogrammes, the number on the plant in the open air was only 37, with a weight of 1.08 kilogrammes.

**THE COMMON REWARD OF INTELLIGENCE AND ENERGY.**

The *Recorder*, of Americus, Georgia, reports the case of a farmer, near that place, whose experience shows very clearly what there is in the common Southern complaint that farming cannot be made to pay in the South. Of this man the *Recorder* says:

"He began life since the war, a poor young man, as a farm hand, working for wages. He has inherited nothing, and has been engaged in no business except farming. He, this year, will make 90 bales of cotton, has not brought a single bale to market, does not propose to sell a bale before spring, and he is able to hold it. He owns one of the best plantations in Southwest Georgia, and it is his boast that he buys nothing upon which to feed man or beast, except sugar and coffee, but, on the contrary, has something to sell of almost any product of Southern soil. Last year he made 1,600 gallons of sirup, and this year has sold over 200 pounds of butter."

If such examples are rare in the South—as they probably are in too many parts of our country—the fault lies more in the men than in their surroundings. There is no part of the settled portions of the United States so poor in natural advantages and opportunities that men of intelligence, pluck, and energy, cannot win therein, if they will, a fortune which, in comparison with that of their less enterprising neighbors, may seem phenomenal.

**Animal Rubber.**

An insect, which produces a species of India-rubber, has been recently discovered in the district of Yucatan, Central America, by an American explorer. It is called *neen*, and belongs to the *Coccus* family; feeds on the mango tree, and swarms in these regions. It is of considerable size, yellowish brown in color, and emits a peculiar oily odor. The body of the insect contains a large proportion of grease, which is highly prized by the natives for applying to the skin on account of its medicinal properties. When exposed to great heat the lighter oils of the grease volatilize, leaving a tough wax, which resembles shellac, and may be used for making varnish or lacquer. When burnt this wax, it is said, produces a thick semi-fluid mass, like a solution of India rubber.

**THE SECOND AVENUE ELEVATED ROAD.**—The first train was run over the Second Avenue Elevated Railway, December 15.

**The Detroit River Problem.**

A board of engineer officers, under orders from the War Department, have been making inquiries with regard to the proper means of solving the transportation problems that have arisen at Detroit, Mich. Briefly stated the difficulties to be overcome and the interests to be reconciled are these:

At Detroit two immense streams of commerce come into direct interference, namely, one by water and the other by railroads. The problem before the Board was to so arrange by either bridge or tunnel that these might cross each other with the least injury to both, and in such manner as to accommodate the railroad traffic, and at the same time do no material or undue injury to the interests of navigation. The magnitude of these conflicting interests at this point may be realized from official statements, which show that the number of vessels of various kinds passing Fort Gratiot lighthouse during the fiscal year ending June 30, 1879, was 22,150, and that the business of the railroads crossing the river at Detroit during the year 1878 was as follows: 129,113 passengers, 12,258 passenger cars, 3,873 baggage cars, and 104,359 freight cars.

The board are unanimously of the opinion that a tunnel under the river offers the most complete solution of the problem. They, however, indorse the bridge plan conditionally. A former board of examiners reported against a bridge project which contemplated draw openings of 166 feet. The present board regard a bridge more favorably in consideration of the facts that draws of more than 200 feet have been since constructed, and that it is now proposed by bridge builders of high reputation to construct them with openings of 300 feet on each side of a pivot pier, or of 400 feet between two pivot piers. With such a bridge they hold that with the present traffic there will be ample time during the intervals between the passage of vessels to move all trains across the bridge. There will occasionally be delays, but the railroads can accommodate their time tables to compensate for any ordinary delays. They say, however, that in case authority to construct a bridge should be granted by Congress it should be distinctly provided that vessels have the right of way, except when moving trains are passing over the bridge.

**Cotton and Corn.**

The report of the Department of Agriculture as to the condition of the cotton and corn crops, Dec. 15, shows that owing to favorable weather in all parts of the cotton belt the crop will be somewhat better than was previously reported. Imperfect ripening in some of the Northern States slightly reduces the average yield of corn per acre. The figures still leave the corn crop larger than that of any previous year by 150,000,000 bushels. The States and Territories west of the Mississippi River return over 100,000,000 bushels more than in 1878.

**HORIZONTAL DOUBLE-ACTING FORCE PUMP.**

We give herewith an engraving of a very substantial and efficient force pump made by the well known Goulds Manufacturing Company of Seneca Falls, N. Y. It is intended for feeding boilers, elevating water, and for other purposes requiring a first class pump.

The working parts of the pump are all brass. The cylinder is brass lined, and by unscrewing the brass nuts at the side, both the upper and lower valves are accessible, without disconnecting either the suction or discharge pipes. The gears are cut, and are six inches and sixteen inches diameter respectively. The relative sizes of these gears may be changed if desired, arranging them so as to work against a very heavy pressure, or to run faster, against lighter pressure. The connecting rod has strap joints with gib and key, and with brass boxes. The crosshead runs on two substantial guides, taking all the lateral pressure from the stuffing box and piston, and at the same time forming a brace from the pump cylinder to the pillow blocks. The pulleys are eighteen inches diameter and five inches face, and have an outside bearing. The frame is all cast iron (weighing over 700 lb.), very heavy and strong, occupying a space five feet long by two feet three inches wide—at the pulleys three feet three inches wide. The whole pump weighs about 1,000 lb. The pulleys may be run at from 120 to 160 revolutions, which would give 90 to 120 strokes of pump respectively. For continuous work the less speed is the best for the economical working of the pump. When used for fire protection it may be run at the higher rate of speed.

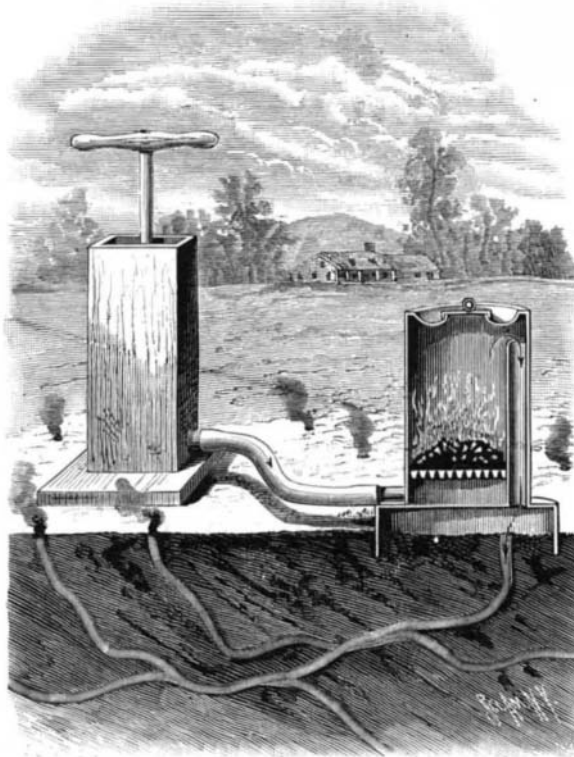
**A Use for Blast Furnace Cinder.**

The following method of utilizing blast furnace cinder in jacketing steam pipes is recommended by Mr. Franz Buttgenbach: Mix 150 parts of cinder dust, 35 parts by weight of fine coal dust, 250 parts of fire-clay, and 300 parts flue dust, with 10 parts of cows' hair, add 600 parts of water,

into which 10 or 15 parts of raw sulphuric acid has been poured, and make a stiff dough of the whole. This is thrown in small amounts upon the warmed pipe, hardening rapidly. Upon this rough coat a second, third, etc., is laid, according to the thickness which is to be used. By the action of sulphuric acid, gypsum is formed, and the silica, rendered free, hardens. The mass becomes as hard as porcelain, and is still porous. It adheres firmly, and never cracks. Mr. Buttgenbach states that he has tested its merits by ten years' use, and has found it to meet all requirements.

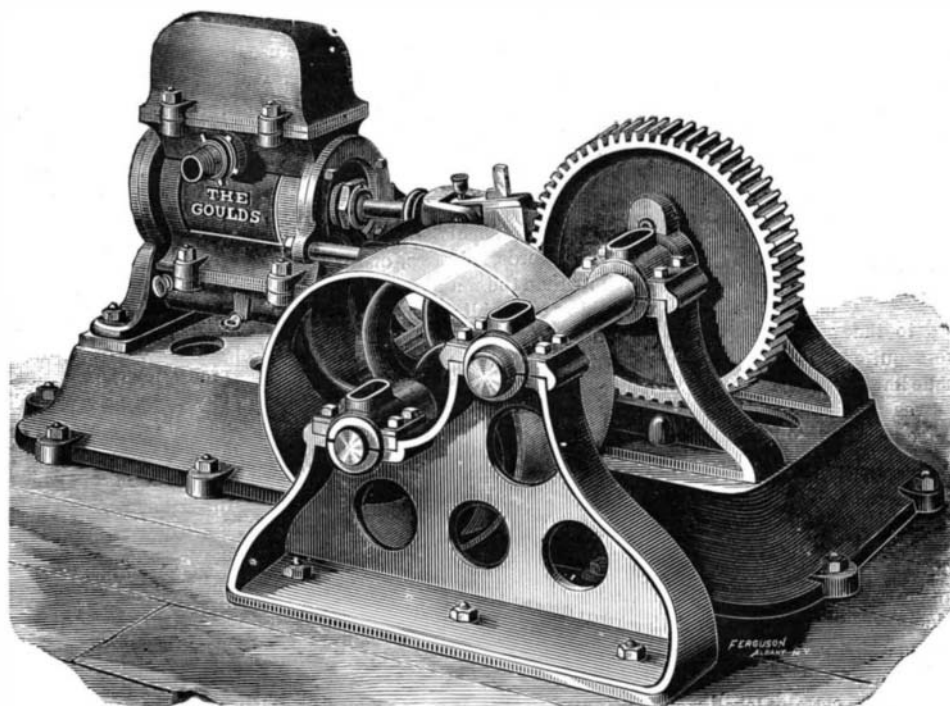
**GOPHER AND ANT DESTROYER.**

The California ground squirrel, commonly known as the gopher, is a great pest to the farmer, destroying enormous

**MELCHER'S GOPHER AND ANT DESTROYER.**

quantities of grain and doing great injury to gardens and orchards. The cutting ants which infest many of the Southern States and parts of California and Mexico, and the moles which are found in various parts of the country, are all enemies to the agriculturist, and destroy millions of dollars' worth of crops every year.

The accompanying engraving represents a novel and effective gopher and ant destroying apparatus, patented by Mr. John C. Melcher, of O'Quin (Black Jack Springs P. O.), Texas. It consists in a fire chamber, having around

**THE GOULDS DOUBLE-ACTING FORCE PUMP.**

the bottom a sharp flange which cuts into the ground around the ant or animal hole, forming a tight joint. The fire chamber has an air space under the grate, which communicates with the air forcing pump through a short section of flexible tube. An internal pipe extends from the bottom of the fire chamber upward to convey the poisonous fumes from the top of the chamber down into the chamber formed by the flange.

A fire having been made in the fire chamber, the poisonous compound is dropped in upon it, and the opening in the top of the chamber is closed. The air-forcing machine being started, all of the smoke and poisonous vapors are forced down into the hole, killing everything animate with which it comes into contact.

**The Need of Mechanical Industries in the South.**

Commenting upon the general need of new industries in the Southern States, the *New Orleans Times* says:

One often hears the remark that the South is slow to take up manufactures which will, undoubtedly, add millions to her wealth, and provide employment for thousands of hands that now perforce are idle. But it must be remembered that, previous to the civil war, the attention of the Southern people was concentrated upon agriculture, which paid, or was supposed to pay, a magnificent profit. The war demonstrated better than anything else could have done the inherent weakness of a people whose entire reliance is placed on one branch of industry. The growth of Southern manufactures has since been slow but steady.

In looking around one finds innumerable articles which were formerly imported now made at home. The magnificent machinery used to take off the sugar crop is now made in New Orleans. And the same is true of many other branches of industry. Cotton manufacturing now, for the first time, comes forward under really favorable auspices, and it is not unreasonable to suppose that it will progress as similar industries have done.

New Orleans has a large population which could furnish the very best class of skilled labor. Our people have all the aptness and taste which they inherit from the Latin race. The great problem we must face is how to convert this large mass of people, who are idlers from the force of circumstances, into bread-winners, adding health and vigor to the community.

**A Rise in Rubber.**

Owing to reports of a partial failure of the rubber crop of Brazil, and the clever management of speculators at Para, the price of rubber was forced from 50 cents to one dollar a pound during the second week in December. During the excitement it is said that in one day several houses in New York and Liverpool bought 2,000,000 lb. of rubber at prices ranging from 75 to 80 cents a pound. Though the report of a short crop was strenuously disputed the price continued far above its natural level. The Para district produces about half the rubber crop of the world, or from 15,000,000 to 18,000,000 lb., the other half coming from Africa and the East Indies.

**ENGINEERING INVENTIONS.**

Mr. Seth C. Doyle, of Harrisonville, Mo., has patented an improvement in the class of couplings in which a swinging link is raised and held in horizontal position for engagement with the drawhead of an opposite car by means of a lever which is attached to the same car as the link.

Messrs. James B. O'Donnell and William J. Dever, of Hazleton, Pa., have patented a brake that can be easily applied to coal or freight cars, gondolas, oil cars, and the like. It is operated by the contact of one car with another.

Mr. Gustave J. Crikelair, of New York city, has patented an improved apparatus for elevating water above the height to which it would naturally rise, by the combined action of gravity and compressed air.

An improved water elevator, patented by Mr. Robert M. Catlin, of Tuscarora, Nev., relates to apparatus for raising water by compressed air, and the apparatus is especially intended for use in mines as a substitute for pumps. The use of pumps for that purpose is open to many objections and disadvantages, such as loss of power from friction, and by reason of the distance the plungers are placed from the motor, the disarrangement of valves and other mechanism, and the cutting out of the piston heads and cylinders by the grit contained in the water.

Mr. Samuel S. Burt, of Marquette, Mich., has invented an improvement in elevated railways. It pertains, first, to securing the track rails upon ties which are so constructed that their ends are made elastic, thus adapting them to yield when a train passes over the road. The manner of construction adopted to secure the requisite elasticity is

to slot the ends of the ties and insert rubber blocks between the posts separated by the slot.

Mr. John M. Cayce, of Thompson's Station, Tenn., has patented a motor designed to operate without weights, springs, magnetism, or expansive gas, which he calls the "hydro-buoyant motor," for the reason that it takes advantage of the buoyant value of a float contained in a body of water. It consists in arranging the float in a receptacle filled with water in such a manner that the float is free to rise, and in rising shall communicate its power to extraneous mechanism, the operation being made continuous by reversing the position of the receptacle containing water, which gives a renewed position to the float, from which it may again rise.