

**Youthful Inventors.**

Eight pupils of one of the New York grammar schools, all of whom are under fourteen years of age, were among the exhibitors at the American Institute Fair. Although manual training is not included in the ordinary grammar school roster, it has been the practice of the principal of their school, Mr. McNary, to form a voluntary class in elementary shop work; and so successful has this effort been, that the models made by these youthful mechanics were judged worthy of a place in the machinery department. They comprise a pump, a dumbwaiter, a guillotine, a brick and mortar elevator, a screw press, a foundry crane, a derrick, two pile drivers, a vapor furnace, a blower, and an inclined railway. They were built to illustrate the applications of the six mechanical powers, and are very creditable to the intelligence of the scholars. The advantages of manual training are becoming more apparent every day. With the abolition of the apprentice system, it is indeed almost a necessary branch of education if the mechanic arts are to be brought to any degree of excellence. Many a man who is but an indifferent clerk or salesman would, if his ingenuity were turned in the right direction, make an excellent artisan. The reopening of these old avenues of occupation is a very desirable revival, and one which may be expected to produce practical benefits.

**The Otto Gas Engine.**

The important case of *Otto vs. Steel*, which had been fought for sixteen days before Mr. Justice Pearson, in the chancery division of the High Court of Justice, London, England, ended on Dec. 19, with judgment for the plaintiff. There was a formidable array of counsel and scientific witnesses for the prosecution, consisting of five lawyers and three scientific witnesses, and the other side was also ably represented. The point at issue was the validity of Dr. Otto's patent of 1876, which was strongly contended for already in *Otto vs. Linford* some years ago, and then decided in favor of the well-known inventor. The defendant admitted that his engine was an infringement of the Otto patent, and if it were valid, he was liable under the statute. The defendant sought to invalidate the first claim on particular objections not dealt with in the former case *vs. Linford*. From the plain evidence furnished by the scientific witnesses, the judge decided that the first claim is strictly accurate according to Dr. Otto's specification. He also considered that the mixture, when fired, is as specified by Dr. Otto, and has exactly the effect which he describes in his first claim; that his invention has not been anticipated by any of the specifications which have been put in before him; and that, therefore, Dr. Otto's patent is a valid and good patent.

The defendant was given one month, within which his engines should be given up. A petition for having the injunction suspended for a longer term was refused on the ground that this action was the second in which the court had declared in favor of the patent.

**SAUCEPAN AND COVER.**

As generally made, the perforations in the main cover of a saucepan are closed or exposed by a supplementary lid (Fig. 1), which is a self-opening and closing one, according to the position in which the

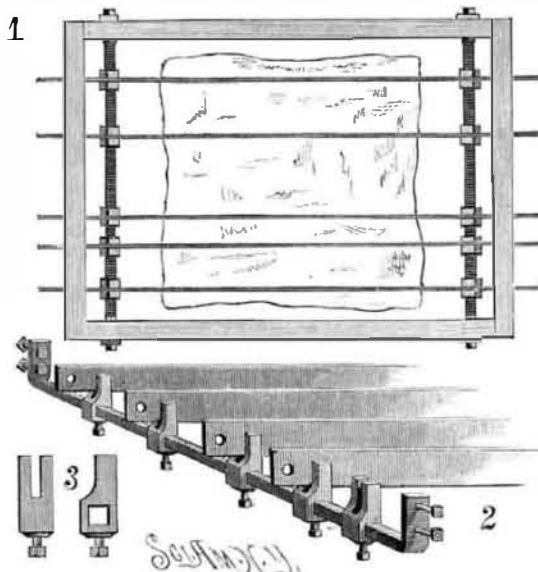
**BRADFORD'S SAUCEPAN AND COVER**

saucepan is held. In the invention here illustrated, a sliding lid (Fig. 2), provided with suitable perforations to correspond with those in the main lid, is substituted for the swinging one. There is no tendency of this lid to open when carrying the saucepan about, and it is only by specially adjusting the lid before tilting the saucepan that the draining openings will be exposed to pour off the liquid. The amount of exposure may be regulated as required by adjusting the slide to bring its apertures either wholly or only partly over those in the cover. The main cover is held to the body of the saucepan by a clip placed opposite the handle and by a sliding clip placed upon the handle. These clips hold the lid very securely, and yet permit of its easy removal when necessary.

This invention has been patented by Mr. George A. Bradford, of Bergen Point, N. J.

**IMPROVEMENT IN STONE AND MARBLE SAWING MACHINES.**

This invention is designed to be attached as a permanent fixture to any stone or marble saw, to provide for a simple and positive method of accurately spacing the saws to any required widths, and to hold the saws securely in a truly vertical position. The saws work independently, so that any one can be taken and replaced in its true position without disturbing the gauge. This construction dispenses entirely with the use of wooden gauges; and slabs of stone or marble from five-eighths of an inch thick to as wide as the gang will admit can be sawn accurately. Fig. 1 shows a plan of the saw frame with this device attached, the saws being spaced ready for work. Fig. 2 shows the device detached and

**COYNE'S ADJUSTABLE STONE AND MARBLE SAW GAUGE.**

the method of spacing the saws. The lugs, shown detached in Fig. 3, are movable on the bar, and can be held securely in any desired position by means of set screws underneath them. Any of the usual methods can be used to bring the saws up tight endwise.

Further information can be obtained by addressing the patentee and inventor, Mr. James F. Coyne, 424 North Halstead Street, Chicago, Ill.

**PHOTOGRAPHIC NOTES.**

*Photographing by the aid of a new Magnesium Light.*—On the 26th ult., at a meeting of the New York Amateur Photographers' Society, a new apparatus for burning magnesium ribbon, designed by the president, Mr. F. C. Beach, was successfully employed for lighting the room and the audience when a photograph was made.

The apparatus consisted of two metal boxes about 14 inches square by 8 inches deep, having bright reflectors inserted at their back, while the front was inclosed with a pane of glass; at the top of the interior was soldered a spring clasp, resembling a garter clamp, and immediately below, in a vertical line, were a series of wire rings, secured to cross wires, arranged two and a half inches apart.

In the bottom, just under the lowest ring, was soldered a projecting wire with a sharpened point, half an inch long. Half an inch on each side of the wire were brass binding posts, which extended through the bottom to the outside, and were insulated from the metal by gutta-percha washers.

Near one side of the box, in the bottom, was a quarter inch inlet tin tube, its inner end being protected or covered a short distance from its mouth by a metal disk one inch in diameter, the latter being held in position by suitable supports. The outer end projected two inches below the bottom.

Each of the outer tubes of the boxes was connected by a rubber pipe to a T, and from the latter to an oxygen gas cylinder (in which the gas was compressed under pressure) located at one side of the room near the operator.

By two No. 16 insulated copper wires the respective binding posts of each box were connected in series to an "Aurora" bichromate of potassium battery, consisting of four large cells, placed near by on the floor, the wires extending from the battery to an open circuit key fixed on the table of the president.

In each box, suspended from the spring clamp at the top, and passing through the wire rings below, were tapers of magnesium ribbon, made by taking a ribbon 48 inches long and folding it upon itself in lengths of ten or eleven inches. The lower end of each taper was then about half an inch above the upper extremity of the projecting pin in the bottom of the box.

The brass binding posts on the inside were connected by a fine platinum wire, No. 40 gauge, and upon the metal pin was put a small piece of sponge about as large as a small marble.

The object of the arrangement thus described was to furnish a means for simultaneously igniting two or more magnesium tapers arranged at varying distances apart, and at the same time to burn them in an at-

mosphere of oxygen gas. By thus confining the white oxide fumes given off, the light was softened and a better effect obtained.

Just before operating, the sponges in each box were dipped in alcohol and then mounted on the wire pins, the platinum wire was arranged to come in contact with the sponge, and, when all was ready, the boxes were charged with oxygen gas from the cylinder below; then the operator, by pressing the electric key, heated the platinum wires to a red heat, which in turn ignited the alcohol on the sponge, and that flame immediately, nearly simultaneously, ignited the magnesium tapers; at the same moment the exposure, which lasted about ten seconds, was made by removing the cap from the lens in the ordinary way.

The experiment was quite novel, and proved to be very satisfactory to the assembly and the inventor.

After the exposure was made, the sensitive dry plate was developed in an adjoining room, and an excellent negative of the audience obtained.

The particular advantage claimed for this system was its use in the photographing of large halls, theaters, etc., where it was necessary to locate and distribute the lamps in inaccessible places or at high elevations.

The manner of burning magnesium powder mixed with sand, thrown into a metal funnel under which was an alcohol lamp, was shown, a brilliant flame of fire resulting. The powder, being very light, would not fall rapidly and regularly through the funnel (which should have a short mouth) unless the inside was smooth and highly polished, and the angle quite acute.

Very probably, further improvements will be made in the use of the magnesium light as an aid in photographing interiors and for making portraits at night.

**The Moon and Us.**

The first of a series of ten scientific lectures, to be delivered before the Science Matinee Club, at the Hotel Brunswick, New York, was that by Prof. Young, of Princeton, on the moon, which was illustrated by the stereopticon. The lecturer spoke of our satellite as the petrified daughter of the earth, since it is destitute of life, air, and water.

The moon has always been a favorite subject of study among astronomers, on account of its proximity and because it is the only heavenly body, with the exception of the sun, that exercises an appreciable influence upon our planet. The lunar temperature is one of violent extremes. In the dark spots, under the shadow of the lunar Alps, it is calculated to be about 200 deg. below zero; while in the localities exposed to the sunlight, the temperature of boiling water is supposed to prevail. Beyond her influence upon the tides, the moon has little power in earthly affairs, in spite of the popular belief in her disturbing action upon the human brain or her assistance in the germination of the sown grain. Were she annihilated, the temperature of New York, Prof. Young said, would be reduced one degree. In her present orbit, however, she has absolutely no influence upon the weather. In conclusion, the lecturer begged artists not to paint their crescent moons upside down, as Hogarth has done in one of his pictures.

**IMPROVED FISH HOOK.**

In our issue of December 19, we described and illustrated a novel fish hook, invented by Mr. Cornelius Lie. The engraving then presented showed the points of the hooks spread out by the strain upon the line when the fish is caught. The accompanying cut shows

**LIE'S IMPROVED FISH HOOK.**

the hooks concealed in the body of the artificial fish, there being no strain upon the line. All further particulars concerning this patent can be obtained from Mr. J. J. Eskil, of Florence, Wis., to whom it has been assigned.

**A Great Cold Wave.**

The heavy snow storm that reached New York on the evening of the 8th of January, and for many succeeding days was followed by such intense cold, was one that has not been equaled in severity and wide distribution by any storm of the past half century. At Atlanta and other points in Georgia, the thermometer has been as low as zero, while at Charleston, S. C., it has gone six or seven degrees below. In Florida, such cold has not been felt since the memorable winter of 1835, when the orange trees were killed. The damage to the orange crop this year has been great. The temperature all over the State has been unusual. At Jacksonville, the thermometer stood at 16°, while Tampa Bay, which is usually free from even frost, it was at 15°.