

**Should Investigators be Teachers?**

It has frequently been observed, with more or less of regret, that some of the most capable of our scientific investigators have had to spend the larger part of their time and strength in the drudgery of teaching, apparently to the grievous hinderance of what would seem to be their true work.

In his paper on "Modern Education: its Opportunity and its Perils," read before the Social Science Association, President Porter, of Yale College, ranges himself decidedly in opposition to this view of the case, holding that science gains more in the quality of its work of research and in the value of its results by a close and active contact with living pupils than it need lose by the distraction of its attention or the lowering of its enthusiasm. He says:

"There is danger that the man of research, who is nothing else, will give himself to a single department of thought, and have neither eyes nor ears nor thought for the facts and truths which lie beyond his horizon. It is well for science itself, that when one of its devotees is inclined to shut himself up in the narrow cave of his own studies and now and then pay unlawful honors to the idols which are hidden there, he should be forced to bring his theories into the light of common day by attempting to teach them to others. Many an extravagant hypothesis might have been nipped in the bud had its romantic originator been forced to state and defend it before the scrutinizing judgment of a classroom of not over reverential youth. We do neither dishonor the eminent abilities nor the actual services of either Mr. Darwin or Mr. Herbert Spencer when we express the opinion that they would have rendered far more valuable services to science had their activities in research been arrested by constant challenging from slow-minded and critical pupils. Whatever may have been true in the past, it is certain that science must fail of a healthy life unless its duties maintain a close and constant sympathy with the intellectual life of the on-coming generation, as represented in our higher schools."

**MECHANICAL INVENTIONS.**

Mr. Henry A. French, of North Orange, Mass., has invented an improved wrench, in which, by pushing on a pin with the finger a lever is caused to raise a pawl, when the jaw can be moved up or down, as may be required, and when the pin is relieved from pressure the spring immediately throws the dog into engagement with the ratchet on the shaft of the wrench.

A lever power, patented by Mr. Mathew C. Franklin, of Lockhart, Texas, relates to improvements in the manner of applying the power and resistance to the lever, so that they will change positions with relation to the fulcrum as the power end of the lever descends.

Mr. Henry C. Forney, of New York city, has invented an improvement in motors for pumping water from wells, the object of which is to utilize the force produced by the gravitation of a weight down into the well or from any height to operate the pump lever.

An improved pawl and ratchet mechanism for mowing machines has been patented by Mr. Hamilton A. Dean, of New Lebanon Center, N. Y. The object of this invention is to furnish a ratchet for mowing machines that shall operate without springs, and with so small a dead point as to obviate the necessity of jerking the machine forward or backward at any time to get it into gear.

Mr. Jacob Inglehart, of East Saginaw, Mich., has patented an improvement in the class of sawmill dogs composed of a series of pivoted hooks which act downward, and an opposing hook which acts upward, so that the log is grasped between them, the two sets of hooks being connected by links and operated by a lever.

Mr. Louis D. Le Nord, of Locksburg, Ark., has patented an improved horse power to be used in giving motion to cotton gins, thrashing machines, and for other similar purposes. It consists of an arrangement of bars and sweeps which cannot be readily described without an engraving.

Mr. John H. Ahrens, of Oswego, N. Y., has patented an improved device for setting circular and other saws, which is so constructed that all the teeth will be set exactly alike, and will retain the set so that less filing and less setting will be required than when an ordinary saw set is used.

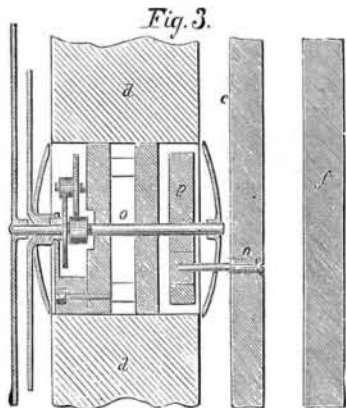
Mr. Henry W. Steinsiek, of Jamestown, Mo., has invented an improved millstone dressing machine which for accuracy and rapidity of work is intended to excel those now in use.

FIFTY thousand gross of watch glasses are sold annually in the United States. Such a statement seems almost incredible, but the figures are from the *Watchmaker and Metal Worker*, which ought to be authentic. One importer alone imports thirty-five thousand gross.

**MYSTERIOUS CLOCK.**

In M. Théodoré's clock, shown in the accompanying engraving, none of the actuating parts are visible. Apparently it has no works, but a close examination shows that the driving mechanism is concealed in the base. Fig. 1 is a front elevation; Fig. 2 is a vertical transverse section; and Fig. 3 shows the dial wheels and their connection with the movable plate that is carried by the clock mechanism in the base.

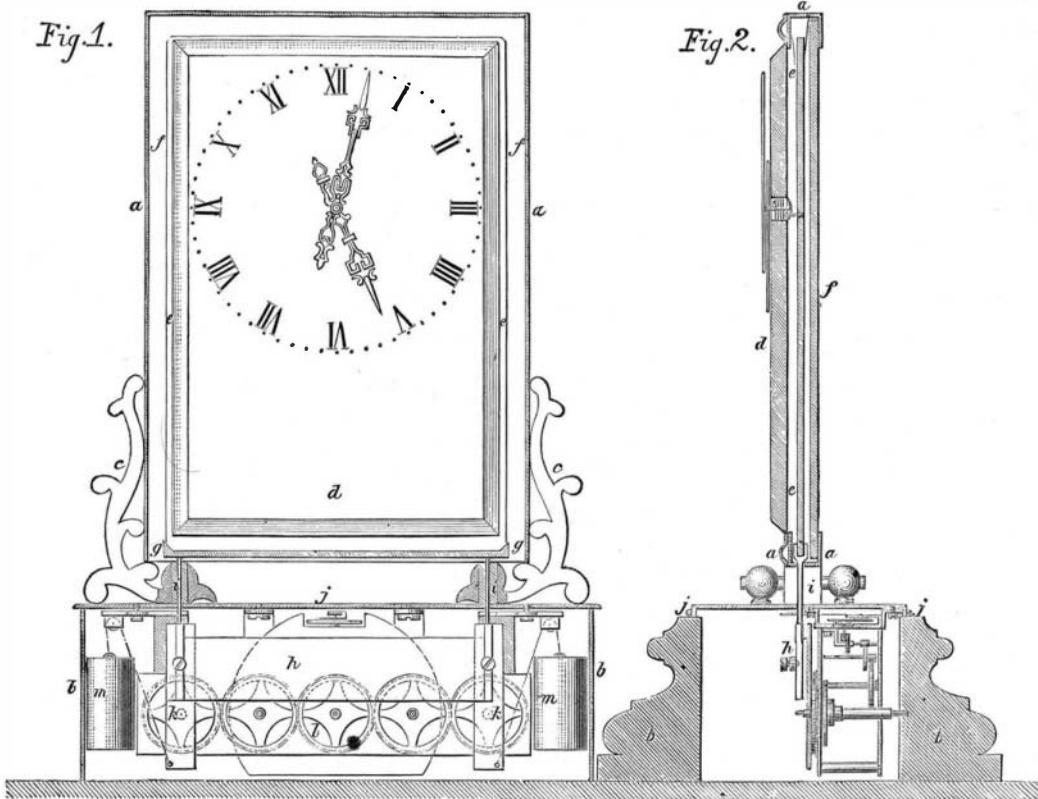
A metal frame, *a*, surrounds three rectangular plates, *f e d*, of glass. The plate, *d*, is thicker than the others, its edges are beveled, and upon it is formed the dial. The plates,



*f* and *d*, are fixed, but the plate, *e*, rests upon a grooved bar, *g*, and is guided at its upper edges by two springs, as seen in Fig. 2. The plate, *d*, supports the hands of the clock and the dial wheels, which are concealed by a small tube passing through it.

The grooved bar, *g*, upon which the plate, *e*, rests, is supported by two vertical rods, *i i*, the lower ends of which are carried by eccentrics, *k*, that receive their motion by a train of wheels from the wheel, *l*, on the minute hand arbor of the clock. The plate, *e*, is counterbalanced by the weights, *m m*.

The two eccentrics revolve in the same direction, and the ends of the bar, *g*, are moved in the same direction at the same time, consequently every portion of the plate describes the same circle as the eccentrics. The rods, *i*, which support the plate, *e*, are concealed by the ornaments, *c*. A small screw, *n*, passes through the plate, *e*, and enters a crank wheel, *p*, concealed in the center of the dial. As the



**THEODORE'S MYSTERIOUS CLOCK.**

plate, *e*, moves this screw carries the crank wheel, *p*, which, being fixed on the minute hand arbor, carries the minute hand. Motion is communicated to the hour hand by dial wheels, which are of the usual form, but very small.

As all of the glass plates are perfectly transparent, they appear as a single plate, and the motion of the plate cannot be discovered by the eye.

**Bessemer Steel.**

The representatives of the Bessemer steel works of the United States held a meeting in Philadelphia, September 3, to consider measures for the regulation of trade, now more active than it has been for several years. Ten out of the eleven Bessemer steel works of the country were represented. Reports from all points showed that the trade is enjoying the highest prosperity and the brightest prospects for the future. Without exception every rail mill in the country has orders for more than it can produce up to the end of the year, and many of them have already taken orders for several months in the ensuing year.

**The Metric System in Philadelphia.**

After extended inquiry among the druggists in Philadelphia, the *Medical and Surgical Reporter* says: "The introduction of the metric system, so far as Philadelphia is concerned, is an absolute failure. There are many reasons for this, and good ones. When closely examined, there is by no means that simplicity about the metric system, nor is there that fixity about it, which its admirers have claimed. Its unit is notoriously based on a mathematical blunder, the meter not being the ten-millionth part of a quadrant of the meridian of Paris, as was supposed by those who first adopted it. It is wrong one meter in every five hundred and fifty-five thousand. Practically it is found very inconvenient to convert accurately apothecaries' into metric weights and measures."

**Carriage Building in the United States.**

The seventh annual convention of the Carriage Builders' National Association was held in this city, October 15. The association has a membership of nearly 800, in the most important cities of twenty States, and represents a capital of \$100,000,000. The importance of the carriage trade and the rapidity of its development are shown by the following statistics compiled by the *Graphic*:

Sixty years ago there were only ninety-two carriage establishments in the United States. They gave employment to 2,274 persons, producing 13,331 carriages of various kinds, amounting in value to \$1,708,741. In 1850 it had increased to 1,822 establishments, employing 14,000 persons, and producing carriages to the amount of about \$12,000,000. From that year to 1860 the increase was extraordinarily rapid, showing that the number of carriage manufacturers had increased from less than 1,900 to 7,234, employing over 37,000 workmen of various grades, and turning out carriages to the value of \$36,000,000. From 1860 to 1870, despite the fact of the loss of our export trade caused by the war, the increase continued at the same ratio, the total number of carriage establishments throughout the Union then numbering 11,944, employing 65,294 persons, paying out \$21,834,355 for labor, and producing about 800,000 carriages, amounting to \$67,406,548. It is now estimated that there are 15,000 carriage manufacturers in the United States, who employ upward of 100,000 hands, pay out from \$25,000,000 to \$31,000,000 for labor annually, and produced during the past twelve months upward of 1,200,000 carriages, amounting in value to fully \$125,000,000. This makes one carriage to about every thirty-eight persons in the United States, to say nothing of sleighs of various kinds. This does not include the

extensive manufacture of axles, springs, wheels, bows, joints, bolts, clips, leather, cloth, and the thousands of articles made in part that are now purchased in a partly finished state by the trade, in which many thousands of men find steady and remunerative employment. These statistics prove without a doubt the claim already put forth that carriage building is entitled to be rated as one of the leading manufacturing industries of the country.

The great manufacturing centers in the carriage line in the East are Amesbury, Mass.; Merrimack and New Haven. The rivalry between Amesbury and New Haven has been spirited during the past three years, but thus far the Yankee town maintains the lead, sending to the market last year 16,000 carriages of different models and of superior workmanship, against 13,000 turned out by the Elm City factories.

New York is the leading center of the Union for the sale of fine carriages, and is rapidly increasing its list of manufactures. Newark and Rahway, N. J., which prior to the war had almost a monopoly of the Southern trade, have failed to recover from the great losses entailed by the struggle, and are no longer great carriage manufacturing cities.

Notwithstanding, however, the changed aspect, some of the finest models of carriage architecture are yet sent to the market by their old and experienced builders, and hopes are entertained by them, owing to the extraordinarily large demands made upon them this year, that they will eventually regain much of their lost trade. Reports from Philadelphia and Wilmington, Del., where carriage building has, within the last ten years, assumed large dimensions, show that the past year has been one of the most prosperous that the trade has experienced. In both cities the manufacturers speak encouragingly of the outlook.

Of the Western cities, Cincinnati, South Bend, Ind., and Columbus, O., take the lead in the carriage industry, eight firms in the first named city having manufactured 63,000 carriages and buggies last year. The product of South Bend, where the largest carriage factory in the United States is located, was less by a few thousand. There are but few great carriage manufactories in Chicago, but it is the chief center of sale of Eastern and Western varieties of carriages and buggies.