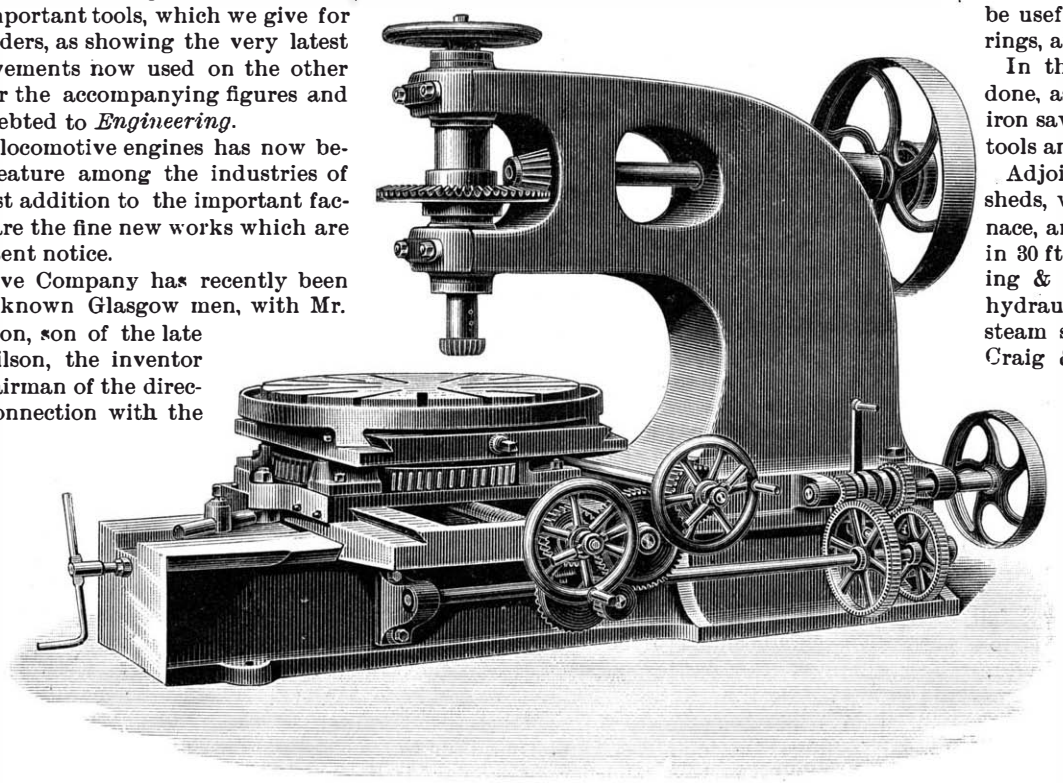
## THE CLYDE LOCOMOTIVE WORKS.

In our last number we briefly alluded to this new establishment, lately put in operation in Glasgow, and gave an illustration of one of the large planing machines there used. We this week present additional engravings of other important tools, which we give for the information of readers, as showing the very latest styles and best improvements now used on the other side of the water. For the accompanying figures and particulars we are indebted to *Engineering*.

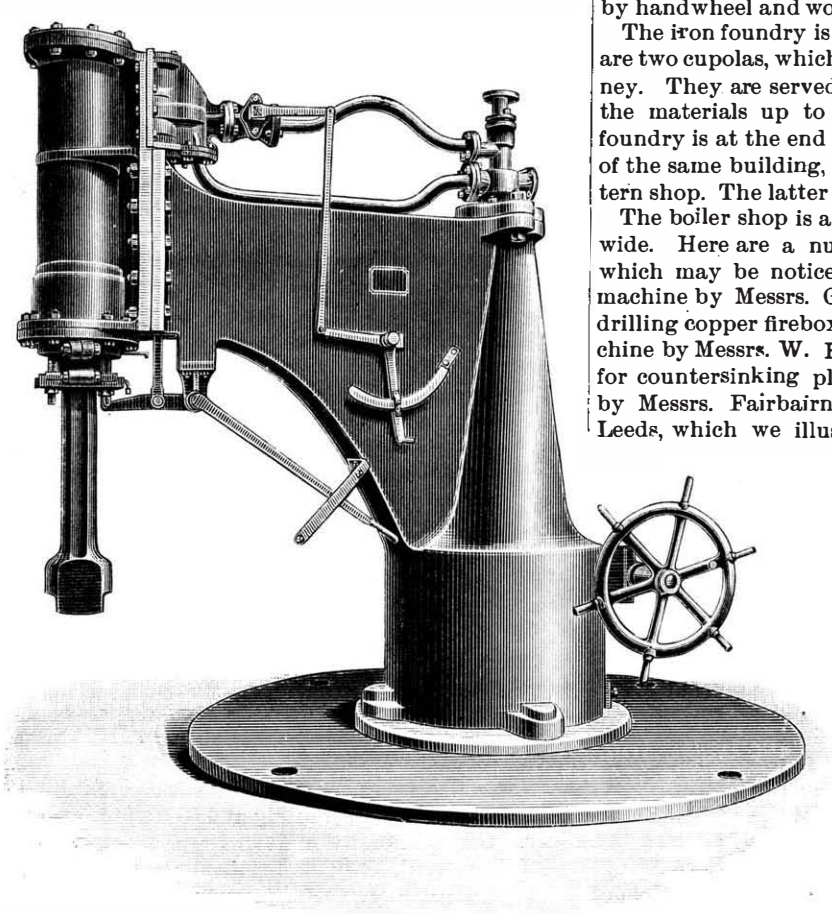
The manufacture of locomotive engines has now become a considerable feature among the industries of Glasgow, and the latest addition to the important factories there situated are the fine new works which are the subject of our present notice.

The Clyde Locomotive Company has recently been formed by a few well known Glasgow men, with Mr. W. Montgomerie Neilson, son of the late James Beaumont Neilson, the inventor of the hot blast, as chairman of the directors. Mr. Neilson's connection with the locomotive trade is well known, he now having been associated with the business for the last forty years.

The works we are about to describe have been laid out specially and solely with a view to making locomotive engines. They are absolutely new from end to end—new buildings, new plant, new machinery, and new tools. We believe there is not a machine or tool in the place that has ever been worked before; in fact, everything is new, except the experience which has directed the laying out of the works, and that is thoroughly matured.



IMPROVED MILLING MACHINE.



RADIAL STEAM HAMMER.

There are few who can have had more experience in the locomotive trade than Mr. Neilson, and that he has made good use of this experience need not be here insisted upon. He has been assisted in the work of laying out the shops by Mr. T. M. Grant, Mr. T. Fleming, and Mr. J. Webster, who have had considerable experience in this special branch of engineering construction, and who all hold important positions in the new works. Mr. Alexander Wilson will take charge of the commercial department. From what has been said, our readers will infer that these shops are likely to be examples of the best locomotive building works, embodying the whole range of experience up to the present day; and, indeed, such is the case, for neither money nor pains has been spared to render them perfect.

The works are situated on the North British Railway, adjacent to the Barnhill and Springburn stations. They at present cover fully ten acres, and are so designed that any department can be extended without interruption to the work. The forge and smithy is 182 ft. long and 131 ft. wide. In the center of the forge building there is a radial steam hammer of about 5 cwt., by Messrs. Davis & Primrose of Leith, of which we give a cut. In this machine the whole hammer, including the single overhanging standard, will turn on its axis, which is the center line of the standard, the steam and exhaust pipes coming in to this axis. This hammer is for dabbing on the spoke ends of wheels, the work being done in dies and the hammer swinging round to cover the work, instead of that having to be shifted. A second anvil will be placed so that the hammer can be used for any ordinary work. The swiveling is effected by handwheel and worm gearing.

The iron foundry is 144 ft. long by 40 ft. wide. There are two cupolas, which lead into one central brick chimney. They are served by a hydraulic hoist for taking the materials up to the charging level. The brass foundry is at the end of the iron foundry, and is part of the same building, and beyond this again is the pattern shop. The latter shop is 130 ft. long by 42 ft. wide.

The boiler shop is a building 162 ft. long and 150 ft. wide. Here are a number of machine tools, among which may be noticed a two-spindle vertical drilling machine by Messrs. G. & A. Harvey, of Glasgow, for drilling copper fireboxes, and a somewhat similar machine by Messrs. W. Robertson & Co., of Johnstone, for countersinking plates. Near this is a radial drill by Messrs. Fairbairn, Naylor, Macpherson & Co., of Leeds, which we illustrate. It has a Crow's patent table, which can be partially revolved by gear in both a vertical and a horizontal plane, and by a combination of the two, a diagonal rotary motion can be given. The table is mounted on trunnions, and is placed over a pit, so as to take work of considerable size. It will be useful for drilling domes, fireboxes, bottom joint rings, and other work of a similar nature.

In the north bay the engine tender work will be done, as well as boiler work. Here are hot and cold iron saws and several smiths' fires, with various other tools and appliances.

Adjoining the boiler shops are the plate flanging sheds, with two plate furnaces, one angle iron furnace, and one frame plate furnace, which will take in 30 ft. There is a hydraulic press by Messrs. Fielding & Platt, for firebox plates, served by a 3 ton hydraulic Bessemer crane. There is also a large steam shearing and punching machine, by Messrs. Craig & Donald, of Johnstone, and an angle iron bending machine by Messrs. Butterfield, of Keighley. Adjoining this shop is the building containing three Lancashire boilers with corrugated flues, by Messrs. Penman & Co., of Glasgow. They are 7 ft. 6 in. in diameter and 30 ft. long. A fourth is shortly to be added.

The principal building in the works contains the machine tool and fitting shops, the erecting shop, and the grindery. It is 268 ft. long and 202 ft. wide, and is divided into seven bays, the end one being partitioned off for the brass finishing and grinding departments.

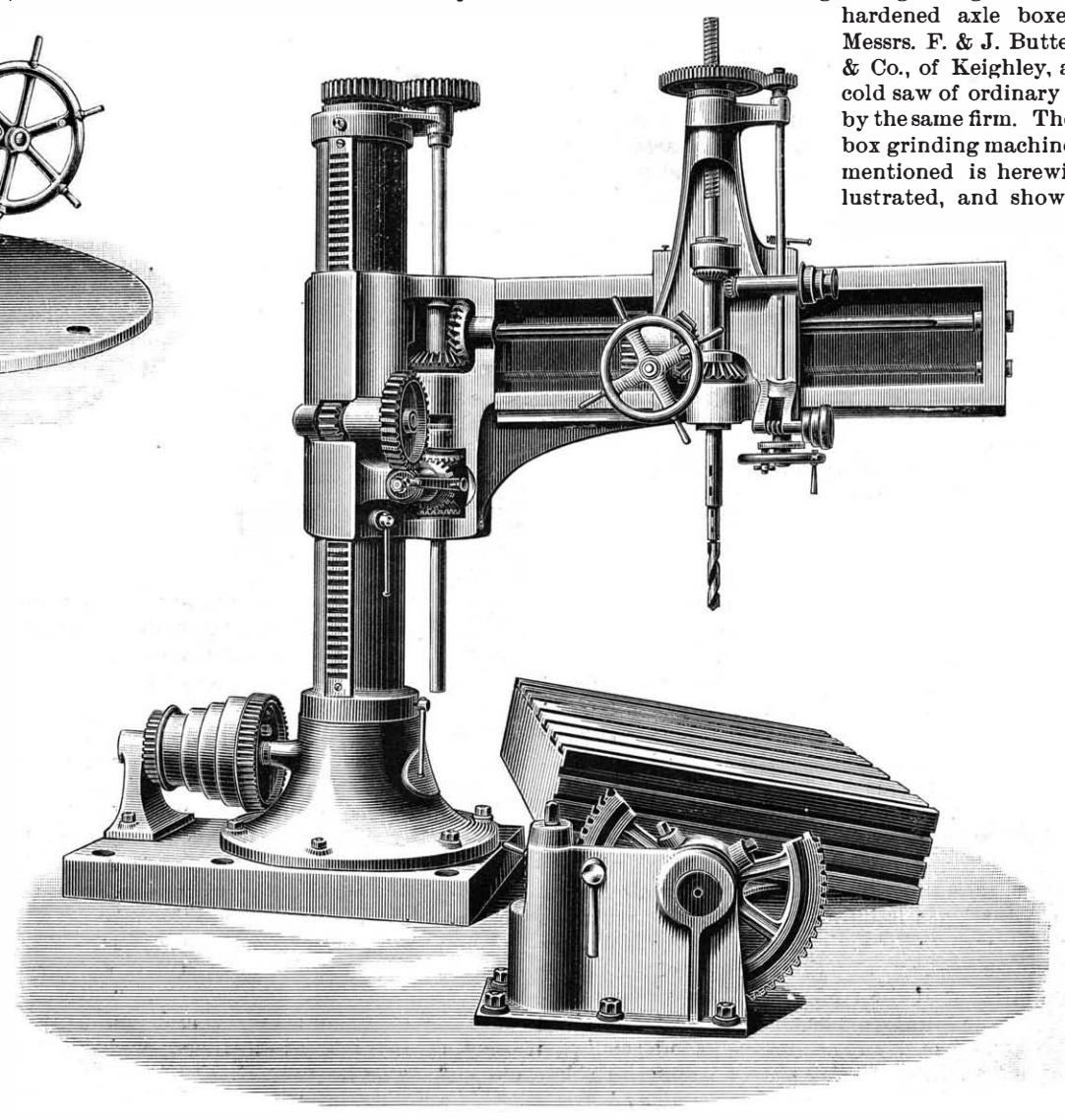
The remaining six bays are devoted to machine tools for the engine department and the erecting shop.

There is near here a large milling machine by Messrs. Craven Brothers, for milling bosses of wheels. It has a compound table fitted with circular and radial motions, the latter being a new feature.

There is a frame plate slotting machine by Messrs. Fairbairn, Naylor, Macpherson & Co., which will take in frames 36 feet long and 4 feet 6 inches wide. This machine, herewith illustrated, has three cross slides which can travel along the bed, and the slides can be swiveled on the standards for slotting diagonally across the frame. This motion is useful for cutting out the wedged-shaped pieces for taking up the wear of axle boxes. Next to this is placed a machine to be used for operating on the same sized frame plates, for drilling the necessary holes. This is by Shepherd, Hill & Co., of Leeds. It has three sliding overhanging headstocks with balanced spindles.

A machine which we think is quite a novelty has been designed for cutting off and centering axles. The spindles for the centering tools are carried in a headstock, which cross-traverses on a slide above the bed. The tool is by Messrs. G. & A. Harvey, of Glasgow.

There is a machine for grinding wrought iron case-hardened axle boxes by Messrs. F. & J. Butterfield & Co., of Keighley, and a cold saw of ordinary make by the same firm. The axle box grinding machine just mentioned is herewith illustrated, and shows the



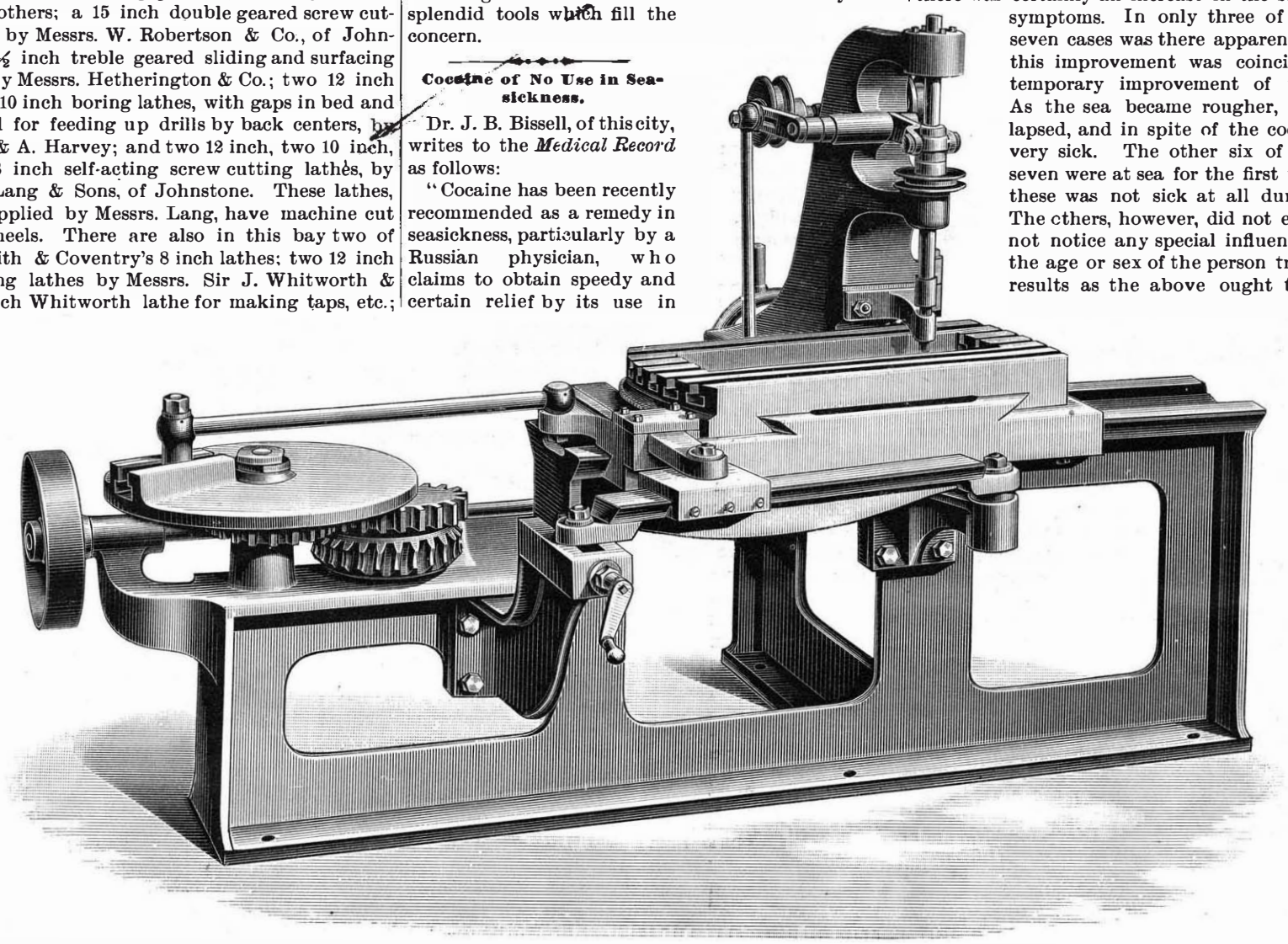
IMPROVED RADIAL DRILLING MACHINE.

arrangement clearly. In the next bay we find the following machine tools, viz.:

A double geared 15 inch screw cutting lathe and a treble geared 14 inch gap lathe, both by Messrs. Craven Brothers; a 15 inch double geared screw cutting lathe by Messrs. W. Robertson & Co., of Johnstone; a 13½ inch treble geared sliding and surfacing gap lathe by Messrs. Hetherington & Co.; two 12 inch and three 10 inch boring lathes, with gaps in bed and clutch feed for feeding up drills by back centers, by Messrs. G. & A. Harvey; and two 12 inch, two 10 inch, and four 8 inch self-acting screw cutting lathes, by Messrs. J. Lang & Sons, of Johnstone. These lathes, like all supplied by Messrs. Lang, have machine cut toothed wheels. There are also in this bay two of Messrs. Smith & Coventry's 8 inch lathes; two 12 inch screw cutting lathes by Messrs. Sir J. Whitworth & Co.; a 7 inch Whitworth lathe for making taps, etc.; six single gear lathes by Messrs. Smith & Coventry; eleven hollow spindle lathes by the same firm; and eight bolt lathes by Messrs. G. & A. Harvey.

In the screwing department, we have a Barrow's patent screwing machine by Messrs. T. Shanks & Co.; two of Messrs. Smith & Coventry's 7 inch chasing lathes; two screwing machines, one by Messrs. Sir J. Whitworth & Co., and one by Messrs. Campbell, Smart & Co., of Glasgow; two four-spindle nut-tapping machines by Messrs. Craven Brothers; and two of Messrs. Sharp, Stewart & Co.'s duplex nut slotting machines. There are also two 12 inch slotting machines by Messrs. Fairbairn, having duplex tables, and one with a radius bar for slot links; three 6 inch and four 8 inch slotting machines, with compound tables, by Messrs. Sharp, Stewart & Co; two 6 inch geared slotting machines by Messrs. G. & A. Harvey; and two 6 inch slotting machines by Messrs. Campbell, Smart & Co. For preparing cutters there is one No. 3 machine tool grinder, one universal milling machine, and a machine grinder to use with it, all by the Brown & Sharpe Manufacturing Company, of Providence, R. I.

Our description is meager, and for lack of space we are obliged to omit the mention of the many other splendid tools which fill the concern.



MACHINE FOR GRINDING CASE-HARDENED WROUGHT IRON AXLE BOXES.

### Cocaine of No Use in Seasickness.

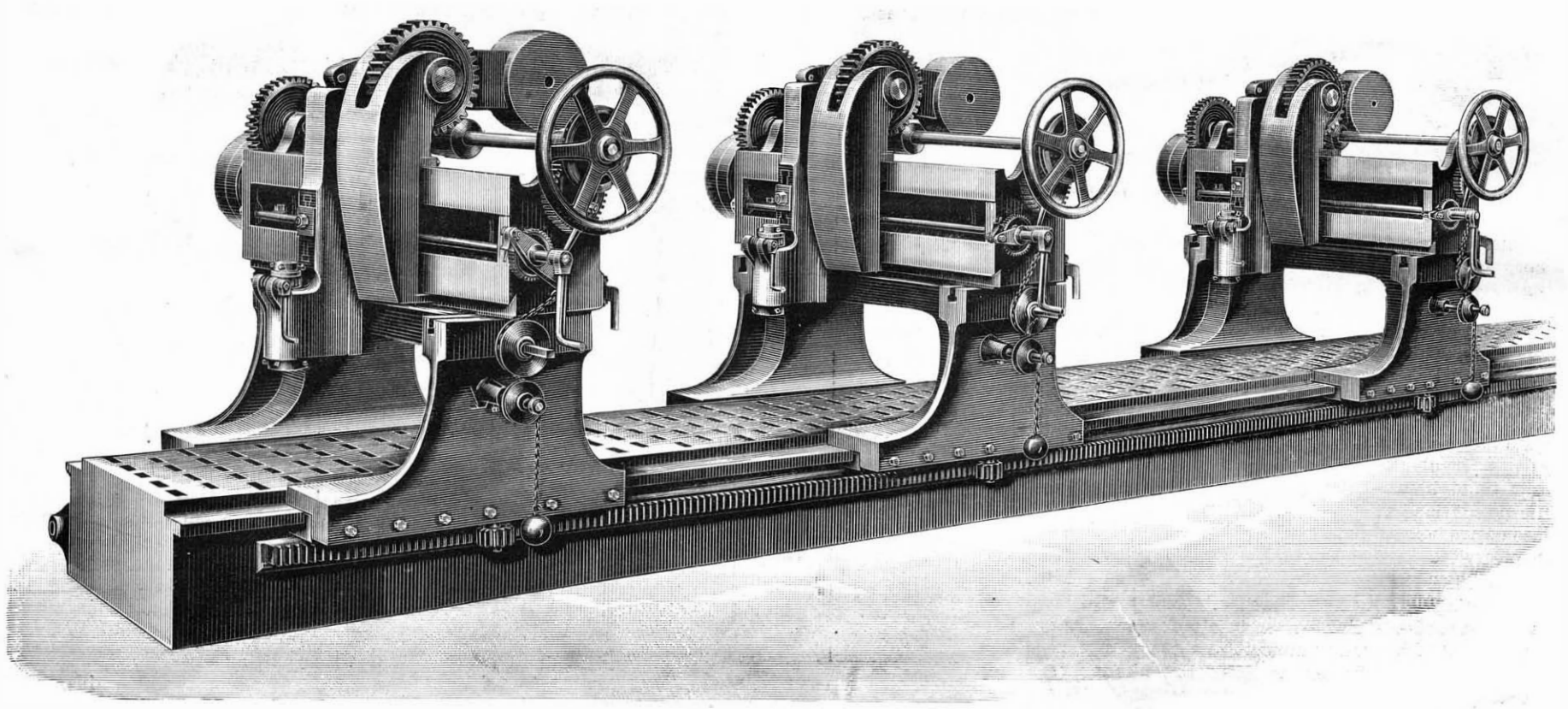
Dr. J. B. Bissell, of this city, writes to the *Medical Record* as follows:

"Cocaine has been recently recommended as a remedy in seasickness, particularly by a Russian physician, who claims to obtain speedy and certain relief by its use in this affection. In a voyage from New York to Charleston, S. C., made in November of last year, an excellent opportunity was afforded to ascertain the value of the drug in this regard. The time of passage was four days, the weather fair, and no storms, but a head wind lasted all the way. The experiments were made on twenty-seven persons of both sexes, and from four years of age to forty-eight. The hydrochlorate of cocaine, in doses of a twentieth and a twenty-fifth of a grain, in tablets, was given by mouth.

"In one set of cases, the medicine was begun soon after leaving the wharf; in another set, at the first symptom of nausea; in a third set, not till vomiting had taken place. In the first set, the dose was a twentieth of a grain, repeated every hour till two grains had been taken. In the other cases, a twenty-fifth every fifteen minutes up to two grains, or, as happened in nearly every case, till the patients became so sick that they refused to continue the drug. This was usually after the fifth or sixth dose. The results from these three sets of cases were almost precisely similar. In twelve cases there was no improvement, if the treatment did not positively make the patients worse. In six cases there was certainly an increase in the severity of the symptoms. In only three of the twenty-seven cases was there apparent benefit, and this improvement was coincident with a temporary improvement of the weather. As the sea became rougher, all three relapsed, and in spite of the cocaine became very sick. The other six of the twenty-seven were at sea for the first time. One of these was not sick at all during the trip. The others, however, did not escape. I did not notice any special influence exerted by the age or sex of the person treated. Such results as the above ought to dispose of cocaine as a remedy in seasickness; but as these results don't advertise any one's special method of administering the drug, or any firm's special preparation, it is very likely it will continue to be used till a newer remedy comes into fashion."

### Iodaldehyd.

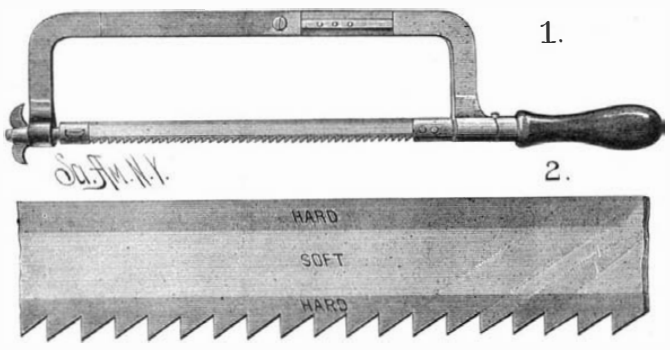
P. Chantard.—Iodaldehyd is a limpid, oily liquid, volatile, not inflammable, colorless, but blackening rapidly in the light. It is decomposed at 80°, and cannot be distilled unchanged, even at the pressure of 0·22 meter. It does not solidify at 20°. Its vapors attack the eyes and the respiratory organs so severely that it can be manipulated only in the open air. Its density is 2·14. It dissolves in all proportions in alcohol, ether, benzol, chloroform, and carbon disulphide. With ammonia it yields, at the ordinary temperature, the different terms of the series of oxaldines, according to the proportions.



IMPROVED FRAME PLATE SLOTTING MACHINE AT THE CLYDE LOCOMOTIVE WORKS, GLASGOW.

### An Instantaneous Boiler.

M. Lestang describes, in the *Revue Industrielle*, a so-called instantaneous boiler, devised by M. Buisson. It is admitted that this problem has received considerable attention, but with not very satisfactory results. M. Buisson's arrangement consists of one or more steel cylinders, closed at one end, and covered at the other by a lid secured by six screws, and pierced with three holes. These vaporizers are from 20 to 36 inches long, and from 4½ to 9 inches in diameter. They are intended to be filled with material called by the inventors "metallic sponge," but consisting simply of small grains of iron, coppered in order to prevent waste by the steam.




CLEMSON'S IMPROVED SAW.

Through one of the holes in the cover a copper tube descends nearly to the bottom of the cylinder, where it terminates in a capillary opening. The steam outlet pipe is connected with another of the holes, the third hole being for charging the cylinder with granular material. The cylinder thus charged is placed in any convenient furnace for making it red hot. Water is then injected into it by means of a pump, and high pressure steam is instantly generated. This pump may, of course, be driven by the engine, which is supplied with the steam. There are means of regulation, whereby the quantity of water injected, and consequently of steam generated, depends upon the demands upon the engine. The injecting pump is thus a capital feature of the arrangement. It will be seen that this system of steam raising is primarily intended for the class of domestic motors, an essential feature of which is that the boiler must not be liable to explosion or to injury by neglect in supplying water or by overfiring. In these tubes there is nothing to be damaged, even if they are left in the fire for any length of time without water.

### AUTOMATIC DAMPER REGULATOR.

The accompanying cuts represent a new, cheap, and simple device for regulating the draught in furnaces of steam boilers. This damper regulator (shown in section in Fig. 2) consists of but few parts, and contains no packing of any kind. The piston head is a loose fit in cylinder, and has a small hole through it for drainage, which is led off through a small pipe from the bottom of cylinder. The valve case contains a small valve, a steel spring, and an adjusting screw, with a milled wheel for setting the tension on the spring to vary the pressure required on the boiler; after once being set the machine is automatic, opening and closing the damper on a variation of only 1½ lb. of steam.

The regulator is adapted for use either on the ash pan dampers or dampers in the smoke pipe. When used on a locomotive, the regulator is fastened to a bracket on the left side of the boiler front, and connected to a rock shaft and thence to the dampers, as shown in cut, Fig. 1, so one or both of the dampers can be used. It has been found by actual test that the saving of fuel by the use of the regulator is one-sixth. This is caused by the regulator keeping the fire at an even heat, and closing in time to prevent the steam blowing from the safety valve, also by making it unnecessary to open the furnace door for relief, and thereby cooling the furnace sheets and causing the tubes to leak.

Its use permits the engineer to carry a regular feed. At the present time these regulators are in use on stationary, steamboat, and locomotive boilers, and are particularly serviceable, as no jar or motion affects them. The present style weighs 5 pounds, is 12 inches long, and 1½ inches in diameter. The inventors propose to soon make a smaller size for use on small boilers.

Further information can be had by addressing Mr. C. W. Townsend, Box 19, Newburg, N. Y.

### AN IMPROVED SAW.

This saw is made of sheet steel in the usual way, with teeth upon one edge; but instead of being hardened upon one edge only, both edges are hardened simultaneously, the center or body of the saw being allowed to remain soft. By this method of construction the expansion of one edge of the saw due to hardening is opposed and counteracted by the expansion of the other edge, so that the saw remains straight. This also secures a very hard and durable cutting edge, and produces a tough and flexible saw, not liable to break.

This saw is the invention of Mr. Geo. N. Clemson, of Middletown, N. Y.; the sole agents are the Millers Falls Co., of 74 Chambers St., New York city.

### Waterproofing Paper.

A new composition for waterproofing paper consists of the following ingredients, combined in the proportions stated, viz.: Resin, 50 per cent; paraffine, 45 per cent; silicate of soda, 5 per cent. These ingredients are thoroughly mingled by heating them together, and by agitation.

The paper to which the composition is applied is usually building or sheathing paper. The latter is taken in the condition in which it comes from the paper machine, being quite dry. A strip or strips of the paper, from a roll or other convenient holder, are conducted and drawn through the tank of hot composition, whereby the paper becomes well saturated with it, and upon emerging from the tank the paper passes between suitable rolls, which press any surplus composition from it, leaving it hard and smooth.

Sometimes the proportions of resin and of paraffine are varied from 5 to 15 per cent from those stated, retaining about 5 per cent of silicate of soda. Thus the proportions of resin and paraffine may vary between 50 and 65 per cent of the former and between 45 and 30 of the latter, making a composition by which the paper is rendered waterproof and durable, when exposed to the weather, and by means of which a surface finish both smooth and hard is obtained.—*Paper Trade Journal.*

### A Thrifty Life Insurance Company.

The forty-first annual statement of the New York Life Insurance Company, which is published in another column, makes a very favorable showing, notwithstanding the depression of the last year in nearly all branches of business.

The New York Life Insurance Company has a surplus of several millions of dollars, and its officers and trustees are recognized as among our most substantial and trustworthy citizens.

This company issues all classes of policies, including non-forfeiture, non-contestable on account of suicide, Tontine investment policies, etc. Their rates for premiums, under their different classes of policies, are liberal, and in all respects the company's affairs are conducted with a business-like sagacity and due regard for the interests of its stockholders and policyholders.

### Complementary Colors.

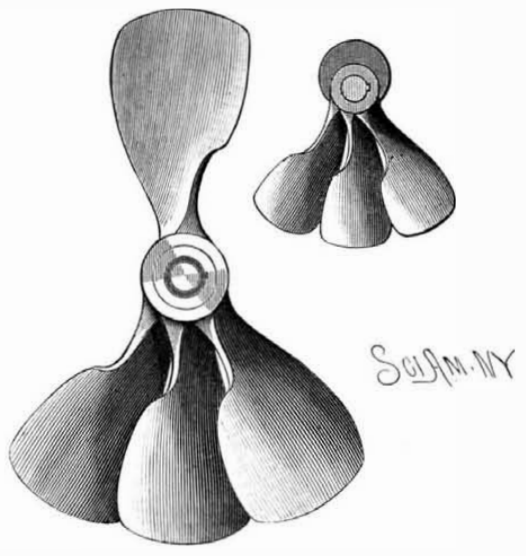
Select several cards of different colors, and in the center of each fasten by a little mucilage a small round piece of black paper. Place over the card thus prepared a piece of thin white tissue paper. The variety of hues which the black assumes is very striking.

### A NEW SCREW PROPELLER.

The propeller here shown does not differ in any way from those of the usual construction, except that the blades are so placed or grouped about the hub as to be unequally distributed; in other words, there are, as in the example shown in the engraving, three blades upon one side of the hub and one heavy blade or a counterbalance weight upon the other. In extensive trials lately made at the Washington Navy Yard, under the supervision of a board of engineer officers, this propeller was found to be superior to the old form in regard both to speed and backing power. In addition, the engine turned centers much more easily with the new form—which is the invention of Mr. A. Vogelsang, of 347 Jay St., Brooklyn, N. Y.—and there was less vibration and thumping.

During these tests the new propeller was of the form shown in the large cut; the screw used by the board had four blades, equally spaced, 34 inches in diameter and 54 inches pitch. The diameters, number of blades shape of blades, surface area, and pitch were alike in both propellers, so that the only actual difference in the two was in the manner of arranging the blades. The new form developed far more power with less number of revolutions, under conditions as nearly similar as possible, thus showing that it had a firmer hold upon the water, and consequently less slip.

It is not necessary that the counterbalance should be so formed as to have a propulsive effect, since a propeller made with a weighted hub, as shown in the small cut, has given decidedly superior results.



VOGELSANG'S NEW SCREW PROPELLER.

### The Tehuantepec Ship Railway.

New and important concessions were granted toward this great work on December 10 by the Mexican Congress, by adding to the previous land grants 1,700,000 acres, which makes the entire land ceded to the company about 2,700,000 acres, equal in area to more than twice the area of the State of Delaware. Coaling stations will be permitted at either end of the railway, to which coal from the United States or any other foreign nation co-operating with Mexico in guaranteeing interest on the bonds of the railway company will be admitted free of duty, to the exclusion of coal from all other countries.

Mexico guarantees that the income of the company shall not be less than $1,250,000 a year for fifteen years, provided that our country, or some European nation, guarantees income to the amount of $2,500,000 more for the same period. In other words, if the income of the company from its business should fall below $3,750,000 per annum, the subscribing governments are to make good the remainder. The time for completing the road has also been extended to 1894. Owing to the encouragement given by President Cleveland, a movement has been started at Washington to obtain favorable action from Congress. Senator Morgan, of Alabama, succeeded in having a resolution adopted calling upon the President for a report on the proposed railway. A large number of people are deeply interested in the enterprise, and some important steps for its advancement will probably be taken during the winter.

A CORRESPONDENT suggests the need of a discovery or invention for preventing trichinæ in hogs, thus putting an end to the losses of life and property which this parasite causes. Here is something for ingenious minds to think of.

Fig. 1.

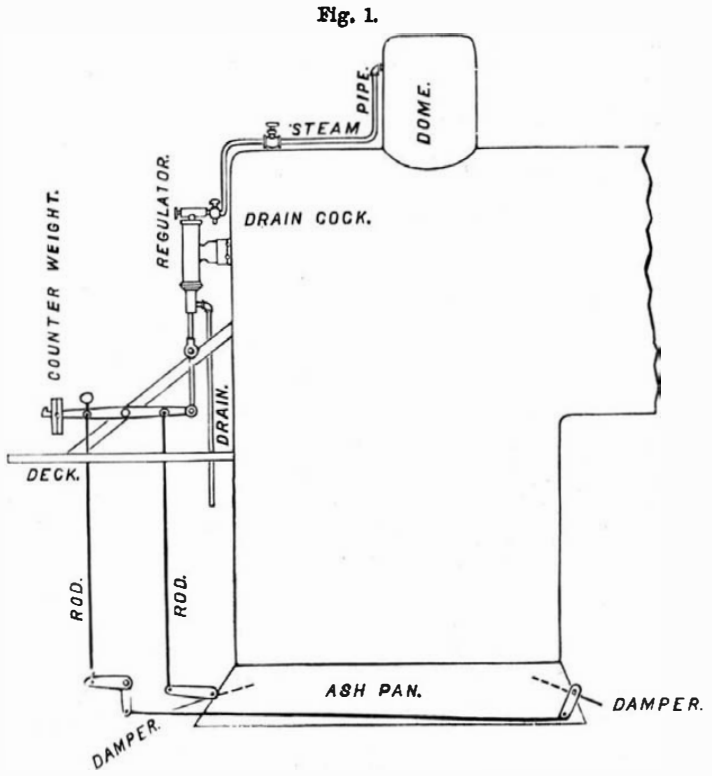
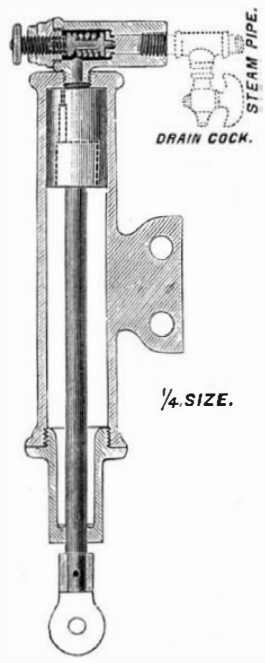



Fig. 2.




McDONALD & TOWNSEND'S AUTOMATIC DAMPER REGULATOR.