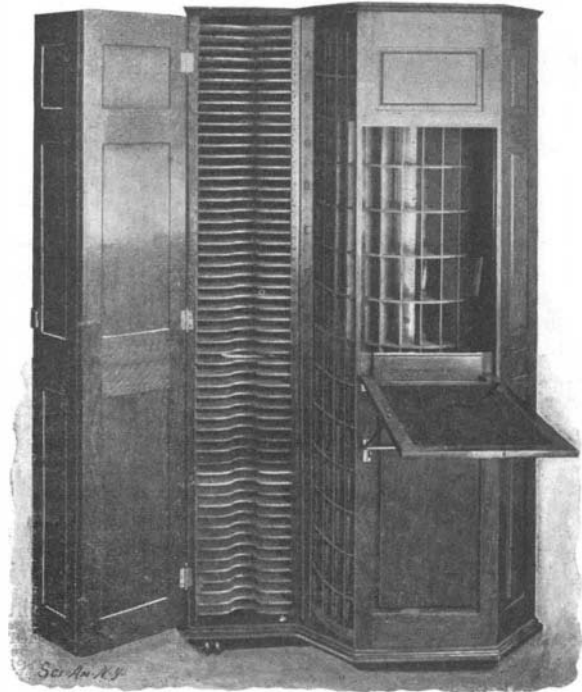


A SIMPLE CABINET FOR FILING PAPERS.

In the accompanying illustration we present a novel cabinet by means of which correspondence, blanks, documents, clippings, and the like, may be readily filed away and alphabetically indexed. The cabinet comprises essentially two parts, a rectangular portion and an octagonal portion. Within the rectangular portion, a box-section rotating on trunnions is mounted, which box-section has an open front and is adapted to receive a number of removable shelves, numbered from top to bottom. A folding-door is provided, which, when the box-casing faces the octagonal portion with its open



A CABINET FOR FILING DOCUMENTS.

front, closes both the rectangular portion and an opening in the octagonal portion.

Within the octagonal portion and adjacent to the rectangular portion, an upright is mounted upon which is inscribed one-half of the letters of the alphabet, the other half being inscribed upon a second upright also secured to the octagonal portion, but at the right hand side of the opening closed by the door.

In the octagonal portion a revolving cabinet is mounted, divided into pigeon-holes in horizontal alinement with the letters on the uprights. The letter "A" for example is adjacent to the upper row of pigeon-holes, and the letter "N" likewise, the two letters serving to index all the pigeon-holes in the upper row. The documents indexed by the letter on the left hand upright will be at the left hand side of the revolving cabinet; while the documents indexed by the letter on the right hand upright will be at the right hand side of the cabinet. At the top and bottom of the revolving cabinet, at the end of each vertical row of pigeon-holes, the twenty-six letters of the alphabet are inscribed.

In filing away papers belonging to "Walter Brown," for example, the cabinet is turned until the letter "W" at top and bottom is brought into view, and in the pigeon-hole at the junction of the vertical column "W" and the horizontal line "B" "O," the documents are filed and placed nearest the letter "B." Under such an arrangement, it is evident that the filing of documents may be accomplished so that no difficulty is experienced in searching for any particular paper.

In front of the octagonal portion a drop-section is hinged, which can be lowered to form a desk.

The patents on this cabinet are controlled by Mr. Cyrenius A. Layton, of Wapakoneta, Ohio.

Electrolytic Cleaning of Metal.

Mr. C. B. Burgess contributes to The Electrical World some excellent notes on the use of electrolysis in cleansing metallic surfaces. The notes have special reference to the preparation of the surfaces for electroplating. The author points out that if the article to be cleaned is suspended in a sodium chloride solution and used as an anode, the metal will be attached and hence cleaned to a certain degree. The anode reaction will, however, have little or no effect on substances of an oily or greasy nature, but the chemical reactions at the cathode afford all that may be desired in this direction. With the above named electrolyte, sodium is liberated at the cathode, immediately uniting with the water, forming sodium hydroxide and hydrogen, which rises to the surface. The reducing properties of the so-called nascent hydrogen thus formed are well known, and whether by the hydrogen alone, or by aid of the sodium, any oxide, sulphide, chloride, or similar compound on the metallic surface serving as the cathode will be quickly reduced to the metallic state. The sodium hydroxide formed will attack the grease or oil, producing saponification exactly as is done in the electroplater's lye vat. In most cases, the chemical action

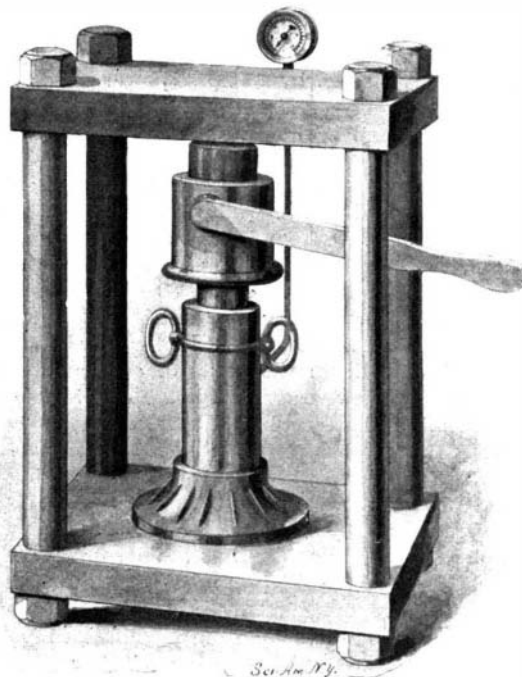
at the cathode will in no way affect the metal itself, but will act only on the foreign substances present, thus allowing polished surfaces to be cleaned without destroying the finish. The electrical energy necessary to effect the cleaning of articles of iron or copper as they come from the polishing room may be taken as approximately equal to that used for the electro-deposition. Although the current density must be considerably greater for cleaning than for plating, the time is much shorter. Current density has a marked effect upon the rapidity of cleaning, and the disappearance of foreign substances in no wise follows Faraday's laws. The following figures, taken from some observations made by Mr. H. A. Smith, illustrate this very clearly. The measurements were made to determine the effect of current density upon the rapidity of removal of a film of grease from an iron surface, such as it acquires from a greasy polishing wheel. The electrolyte was a nearly saturated solution of sodium chloride:

Current per square foot.	Time necessary for cleaning.
20 amperes.....	15:00 minutes.
40 ".....	3:50 "
140 ".....	0:75 " about.

With a solution of potassium hydroxide a current density of 80 amperes per square foot cleaned the iron almost instantly. Some of the advantages of the electrolytic method of cleaning over that commonly used in an electroplating plant are the following: There is less complication from the fact that the cleaning vat may be of similar construction to the plating vats, and connected to the bus bars in the same way. There is a considerable saving in labor and material in dispensing with the hand brushing. After once wiring an article there is no need of touching it with the hands, for it may be transferred directly from one tank to another. The oxides and other metallic compounds may be removed simultaneously with removal of grease and dirt, thus avoiding the use of a cyanide or an acid dip. A metal which has a brightly polished surface may be cleaned without destroying the polish.

AN IMPROVED HYDRAULIC PRESS.

The mechanical engineer, and specially the mining engineer, is often in need of a hydraulic press for the purpose of testing materials, for making briquettes, or for similar purposes. Our engraving shows a very simple hydraulic press which can be made by any one who has a hydraulic jack. Two wrought iron plates 12 inches square and 2 inches thick are bored to receive upright rods, one at each corner. These rods may be of any desired length up to 5 feet, and should be about 2 inches in diameter. The height should be regulated by the size of the jack and the class of work which is to be accomplished with the aid of the press. By the use of blocks of wrought iron or steel, it is possible to regulate with great ease the distance through which the pressure is exerted. The hydraulic jack may be provided with a gage which indicates pressures varying from 2,000 to 4,000 pounds to the square inch. It would be possible to make the top and bottom plates of cast iron, provided they were reinforced by diagonal ribs. We are indebted to Alexander Roy



A SIMPLE HYDRAULIC PRESS.

a mining engineer, for this suggestion. Mr. Roy has used a press of this kind in making briquettes for testing purposes.

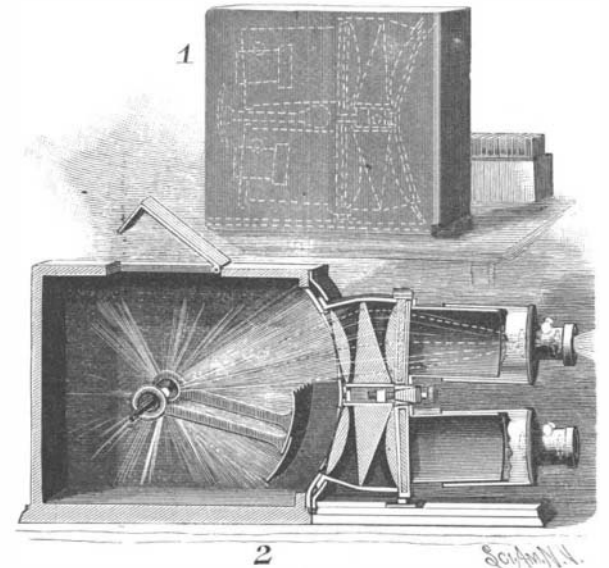
In Tasmania the trade in axes and saws has been almost entirely monopolized by Americans. It is now the intention to carry on international competitions between teams of axmen and sawyers, using British and American tools, with the object of proving which country manufactures the best implements.

A NEW FORM OF STEREOPTICON.

A multiple dissolving-view lantern has been invented by Dr. Samuel E. Woody, 600 West Broadway, Louisville, Ky., which includes various improvements in construction, by which the light is so refracted that the picture from each of the two optical systems appears on the same spot of the screen.

Referring to Fig. 2 of our engraving, it will be observed that two condensers are mounted at the end of the light-casing, the upper being fitted to slide in a segmental guideway on the light-casing so that it can be adjusted relatively to the lower, by means of a wedge interposed between the frames of the condensers. By reason of this adjustment a proper registration of the two pictures projected by the two optical systems is obtained.

Each condenser is provided with two plano-convex



A NEW FORM OF STEREOPTICON.

lenses, having a prism interposed between them, so that the rays of light passing to the first lens are refracted by the prism to the other lens adjacent to the slide-holder. The two lenses of each condenser are inclined to each other, and the interposed prism refracts the rays of light at a proper angle.

The apparatus is provided with a shutter held movably in the light-casing between the light and the condensers. By operating the shutter the rays can be made to pass through one or the other of the condensers.

In the modified form shown in Fig. 1, the light-casing, in addition to the ordinary function, serves as a receptacle for the condensers, the slide-holders, and the adjustable tubes carrying the objectives, thus facilitating the transportation of the apparatus. In order to obtain this compact arrangement, the bottom of the light-casing is formed with a dovetail groove adapted to register with a similar groove in an extension hinged to the outer end of the bottom, and forming a cover for the open end of the casing when the several parts are stored. In the registering dovetail grooves a support slides which carries the stereopticon parts. In using the device the extension is swung down and the support carrying the stereopticon is slid out, reversed, and reinserted in its proper operative position.

Interesting Discovery in the Tower of London.

It would really seem impossible to make any new discovery in the Tower of London, which has been examined so many times by architects and antiquaries. Some unusually interesting discoveries have just been made in the process of laying the foundation for the erection of a new guard-room near the White Tower. The workmen cut the Roman wall of the second century and found a number of perfectly preserved flue tiles for the diffusion of hot air from the hypocaust.

These tiles are excellent specimens, measuring 15 inches in length, 6½ inches in width, and 4½ inches in depth. According to a cable dispatch to The New York Sun, while removing the mud from the subway leading from the river and the moat, the workmen discovered a number of iron and stone shot, left, it is believed, at the time of the conflicts between the royal troops and the rebels under Wyatt, in 1554. The shot are thickly set in a conglomerate of mud and gravel, mixed with human bones and bits of armor, showing firing with deadly effect at close quarters.

The Fish Commission Expedition.

The United States Fish Commission is about to send out one of the most extensive scientific expeditions ever arranged by the Commission. The expedition will sail on the "Albatross" in charge of Prof. Agassiz to explore portions of the Pacific Ocean. Some of the islands to be visited are the Marshall, Society, Friendly, Fiji, and Gilbert groups. It is expected that the trip will require eight months, and will leave San Francisco in August.

An Emotional Curve of Literature.

It seems as though psychology is now invading every stronghold of science, literature or art. A graduate student at Columbia University, Mr. Gerrard, has submitted an interesting original thesis entitled "Emotional Expression in Literature," and the results of this method are very interesting. He notes carefully his own emotions while reading literary works and then studies out what passages caused the emotions. These passages were then copied off or cut out until he has a very large number of clippings and memoranda, says *The Sun*. He noted the number of emotions and emotional elements for each hundred words in the various works or by the several authors. He grouped the clippings in different ways as similarity of themselves or as the emotions they excited suggested, and so eventually perceived what he calls the laws which govern the production of emotions by language or the expression of emotions in written speech. He says in his introduction:

"This work is the outcome of a desire to find the elements used in expressing ideas and emotions in literature; to learn how these elements are used, and to see if, the elements serving as a basis of valuation, some method could not be devised whereby the strength of literary works could be measured. . . . It was early noted that descriptive work used different elements than did narration or character interaction. . . . This discovery of the elements was extremely trying work, since one in seeking must be ever on the alert, must know exactly when the emotion comes to him, and must try to locate the exact part of the passage in which the effect was to be found. This necessitated a high degree of mental and emotional sympathy with the work under consideration, together with enough self-control and introspection so as to be able to judge without being carried away by the work. Once the elements were discovered, the laws governing them began to appear one by one.

"The value and use of the elements has been tested in other ways. A very acrid speech by a Southern Senator deprived of a very few adjectives became extremely pacific."

Of his literary elements he says: "Man receiving sensations from all his senses at one time may unite them and represent the united sensations in one expression; or he may unite them with other stored stimuli and produce an expression resulting from hundreds of stored stimuli. Such an emotion would in literature find expression in a discourse, while several sense impressions from the eye, ear and finger combined would, perchance, produce a noun or a verb; while each sense impression might find expression in an adjective or an adverb. . . . It will be noted that the strength of the ordinary figure of speech is due to the fact that in it the condensation of a larger whole into a smaller one is strongly felt. A verb idea is put into an adjective, or a paragraph idea is put into a verb. A proverb is a condensed drama, a joke a comedy in miniature. Each paragraph was once a whole literary work; each perfect word contains a condensed play. . . . A dramatic moment is a larger whole than is a paragraph. . . . To show the emotion and emotional changes in a work of literature, graphic curves have been made as follows: Taking 100 words as a unit, I have found the number of nouns, verbs, clauses, sentences, paragraphs, or dramatic moments per 100 words. . . . These curves show us at a glance in what part of a work any element dominates; thus one finds the adjectives, and nouns, dominate in the beginning of 'Marjorie Daw,' while at the climax of the story the verbs greatly preponderate, as again nouns predominate in the anti-climax."

Mr. Gerrard represents graphically, in his thesis, by his curves, the emotional measurements of "Pippa Passes," "Camille," "Magda," "Hamlet," "Desdemona," "Red Riding Hood" and many other works and characters of literature.

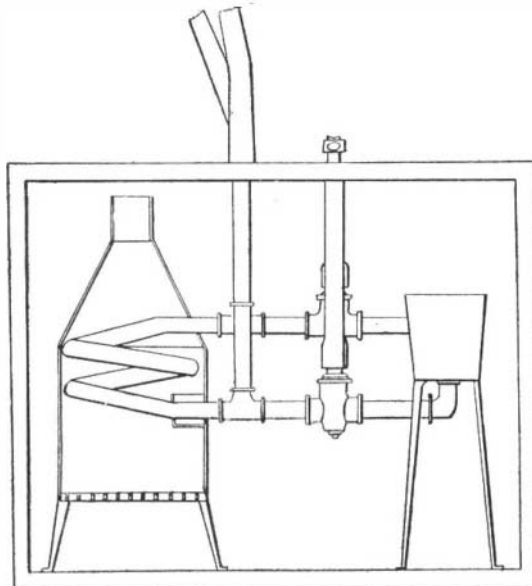
A New Polar Expedition.

There are already four polar expeditions under way, or almost ready to start, and to these must soon be added that of Capt. Bernier, a Frenchman. His course will be toward Franz Josef Land, steering for the part lying to the east of Cape Mary Harmsworth, pushing on as far north as possible, and he will then disembark with all the provisions, dogs, reindeer, sledges, etc. He intends to pass the winter at Petermann's Land, which is probably an island lying in about 83° north latitude and 58° or 59° east longitude, that is about 420 miles from the pole. At the first opportune moment he intends to make a dash for the pole. If possible he hopes to cover the 420 miles in 100 days, which is good traveling in this part of the Arctic regions. He expects to return from the pole by a route which will permit of reaching Spitzbergen and he thinks he will reach Dane Island, where Andreé started in his balloon, toward the middle of autumn. If he reaches this

point, he will have to spend the winter there, as steamers run between Norway and Spitzbergen only during the warm season. He has an alternative plan of operation by way of the River Lena, and which the "Jeannette" followed in 1881.

THE BRICKILL FEED WATER CASE.

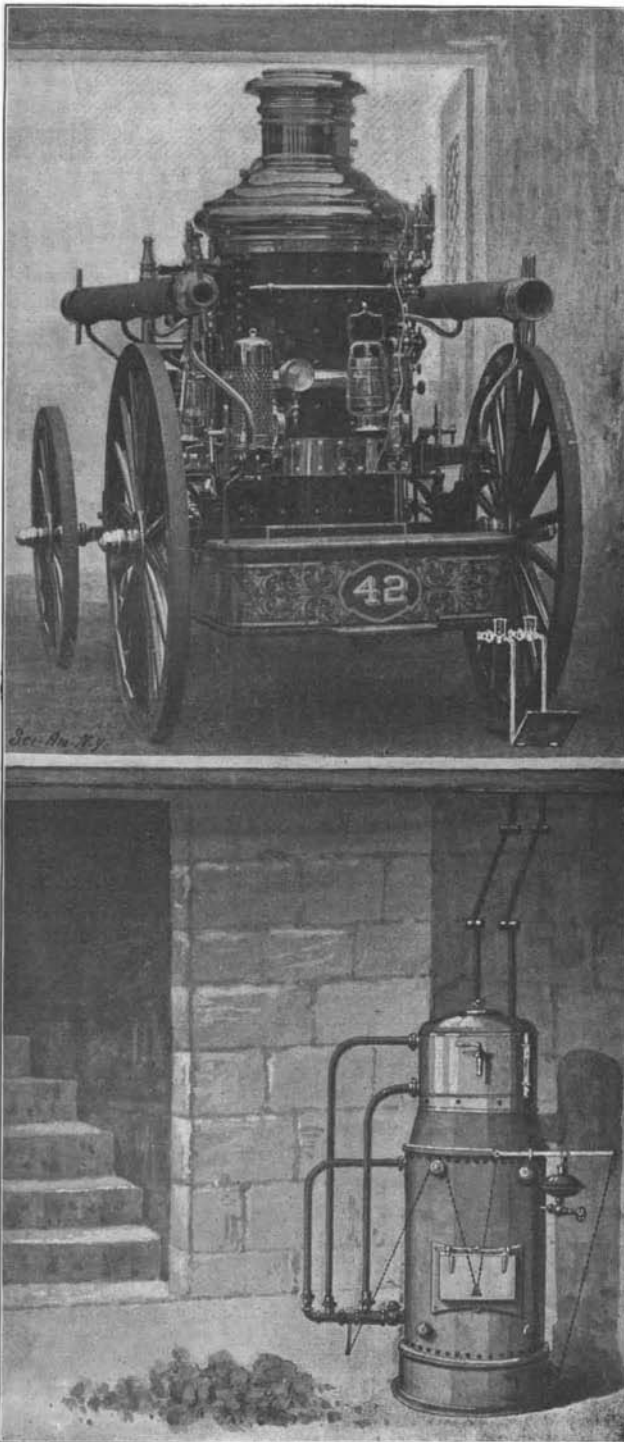
On May 19, Mr. George E. Howard, special master in a suit brought against the city of New York, by the heirs of William A. Brickill, to recover money saved to the city by the use of a patented feed-water heater for



BRICKILL'S ORIGINAL HEATER.

steam fire-engines, filed his report in the United States Circuit Court. The master awards the complainants \$894,633, of which sum \$194,716 is interest. This ends one of the most interesting legal battles for the defense of patent rights which has ever been fought. The case has been in the courts for twenty-nine years, and it is to be hoped that it is now definitely settled.

William A. Brickill was foreman in the New York Fire Department. He had been an enthusiastic fireman in



IMPROVED FORM OF FEED WATER HEATER.

the old volunteer days, and when the city established the regular paid fire department, he was retained as an engineer. He was a skillful mechanic, and devoted a good deal of his spare time to perfecting fire apparatus. In 1868 he invented and patented a feed-water heater for steam fire-engines, by which water could be kept very hot in fire-engines without fires being kept lighted under the boiler.

Mr. Brickill left the Fire Department and asked that the city pay him for the use of his patented device. The authorities contended, however, that he did the work while in the employ of the city and that he was doing nothing more than his duty. The patentee entered a suit for damages for infringement of his patent, and the suit dragged wearily on, so that at the end of ten years he had spent all his savings in litigation, and at the end of seventeen years the patent expired. He offered to settle with the city for \$50,000, but this was refused, and it is probable that the city will now be mulcted in a large sum.

The device is most interesting, and the decision is important from a legal point of view, as it affects the right of the inventor to the fruits of his invention. It has been decided by the courts that employers are not entitled to the inventions or patents of an employé, unless there is a special agreement to that effect, which was not the case in the present instance. An employer, who has in his pay a skilled workman engaged to devote his time and services in devising and making improvements in articles manufactured by the employer, is not entitled to the conveyance of any patents obtained by the employé, unless there is a distinct agreement to that effect.

Nowadays no engine house where a steamer is located is properly equipped unless supplied with a heater. It is necessary to keep the engine room constantly warm in cold weather to guard against frost, so that some form of heating apparatus is required, and Brickill's invention calls for an attachment to such a heater which would at the same time supply water to the fire-engine boiler very near the boiling point, in order that when an alarm is turned in, the engine can start to the fire, and by the time the scene of the fire is reached, a sufficient pressure of steam has been raised which will permit of working the pumps. Our small diagram shows the original device of Mr. Brickill. Naturally it has been much improved upon as the device shown in our engraving represents an approved form of heater for steam fire-engines. The heaters are usually placed in the basement and are usually made in sizes which can supply either one or two engines. The heater is automatic, coal or coke being supplied to the fire through a self-feeding mechanism. Damper regulators keep the temperature steady and uniform; they can be adjusted so as to maintain any required pressure from the boiling point upward. The steam capacity is from 25 to 50 pounds of steam. The heaters may also be placed on the same floor as the engine, but in the majority of cases they are placed in the basement directly beneath the engine as shown in our engraving.

The circulation of hot water in the boiler of the fire engine also tends to prevent the deterioration of the boiler. The pipes usually come up through a trap in the floor, and valves are provided so that the forward movement of the engine immediately closes the valves in the pipes attached to the engine, and also to the heater, and changes the circulation of the water from the engine to the tank on the heater, and opens the damper on the heater when the action of the regulator will at once close the draft. Other devices have been provided, such as valves which are operated by the foot as the engineer mounts the tailboard. If desired, the engine can be run to the scene of the conflagration without lighting the fires, and steam can be rapidly raised if it is found the alarm is a true one. This, however, is not done much in large cities.

Director of Allegheny Observatory.

Prof. F. L. O. Wadsworth, of the Yerkes Observatory of the University of Chicago, has been appointed Director of the Allegheny Observatory. He succeeds Prof. J. E. Keeler, who recently went to the Lick Observatory. Prof. Wadsworth will take charge on January 1, next. He has been connected with the Yerkes Observatory since its opening in 1897, as instructor in astrophysics. He came to the University in 1894, from the Astrophysical Observatory, in Washington.

TESTING SODIUM SULPHITE.—To test sodium sulphite for its chief adulterations, proceed as follows: By adding the few drops of barium chloride solution to the solution of the sodium sulphite to be tested, a white precipitate results. Same must be soluble in hydrochloric acid. If it is not, sodium sulphate is present. If phenol-phthalein paper moistened with sodium sulphite solution is dyed red, sodium carbonate is present.—*Deutsche Photographen Zeitung*.