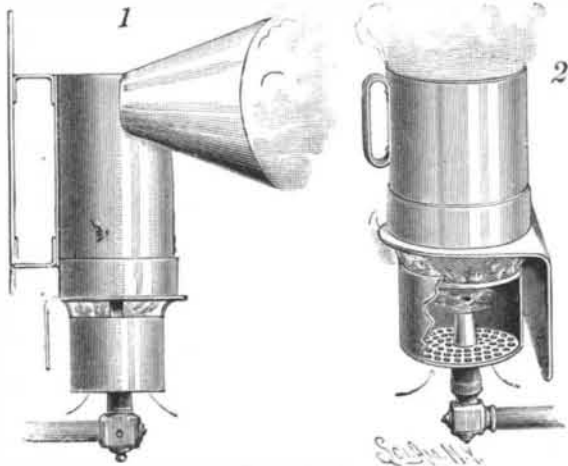


A HEATER FOR USE WITH A GAS BURNER.

The illustration represents a simple device for use in connection with a gas burner, to heat water or other liquids or food, or to heat rooms or passages. It has been patented by Mrs. Mary L. W. Martinot. The burner of the heater is of gauze or equivalent material, with a central opening to receive the gas burner, and upwardly projecting brackets support a semicircular table with a central opening, the table having a flange in contact with which rests a drum of sheet iron or other suitable material. Near the top of the drum is a side opening surrounded by a hood, adapted to direct the ascending hot air some distance out into a compartment to be heated, as shown in Fig. 1. Both the drum and the table have shields at the rear for the protection of adjacent woodwork. When the device is to be used for heating liquids, etc., the drum is removed, and a cup or other receptacle corresponding in contour to the space within the table flange is placed upon the table, as shown in Fig. 2. The device may be further supported, if desired, by attaching the upper shield to an adjacent wall or other upright.

For further information relative to this invention



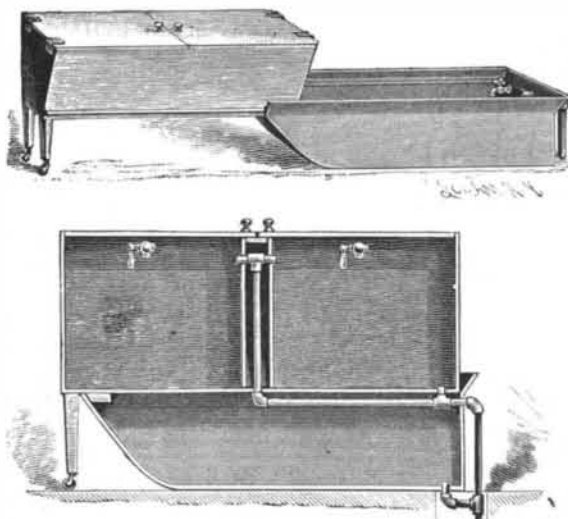
MARTINOT'S HEATER.

address Mrs. Mary White, No. 1541 Broadway, New York City.

A COMBINED BATH AND WASH TUB.

In the construction shown in the illustration either tub may be used independently as desired, and each has an independent overflow or waste, as shown in the lower sectional view. The improvement has been patented by Mrs. Mary L. W. Martinot, of New York City. The bath tub has a top flange extending around both sides and one end, with grooves adapted to serve as slideways for longitudinal ribs on the bottom edges of the wash tub, and the latter has, at one end, legs provided with castors, for its support when drawn out from above the bath tub, as shown in the upper figure. Stop blocks limit the outward movement of the wash tub, and branches of a waste pipe are carried up within the tub in the usual manner. The waste pipe of the wash tub has a sliding connection with the main waste pipe leading to the sewer or other outlet, with which the bath tub also has a bottom connection. When the bath tub is to be used, the upper tub is drawn out, as shown in the illustration, and is afterward returned to place above the bath tub previous to employing the wash tub.

For further information relative to this invention



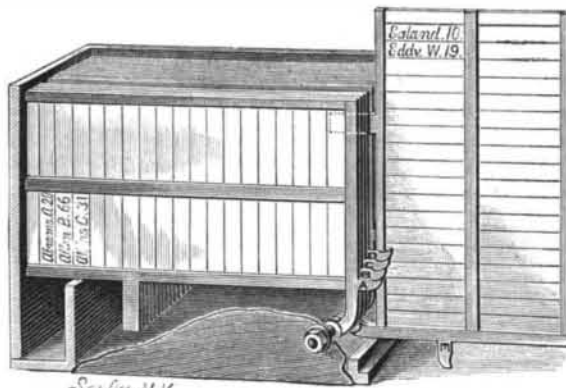
MARTINOT'S COMBINED BATH AND WASH TUB.

address Mrs. Mary White, No. 1541 Broadway, New York City.

THE body of every spider contains four little masses pierced with a multitude of holes, imperceptible to the naked eye, each hole permitting the passage of a single thread; all the threads, to the number of 1,000 to each mass, join together when they come out and make the single thread with which the spider spins its web, so that what we call a spider's thread consists of more than 4,000 threads united.

AN IMPROVED INDEX.

The illustration represents a convenient form of index, by means of which the references contained upon



JUDGE'S INDEX.

any page may be readily exposed to view, the reference cards or memoranda being inserted or changed with facility as desired. It has been patented by Mr. William A. Judge, of Santa Barbara, Cal. The index pages are held in a case open at the top and one end, there being near the inner end of the case a low transverse partition serving as a rest for the sheets in normal position in the case, and near the other open end a similar but lower support to hold up the displayed sheet. A rod held in suitable position by nuts extends through the case near the lower corner of the open end, and upon this rod is pivoted a series of bars each having a slight curve near its pivotal point, and each having a lateral ear adapted to receive an initial letter. These ears are arranged one above another upon the bars, so that all the letters will be exposed to view when the sheets lie horizontally in the case. Extending at right angles from the bars are strips provided with a suitable backing so attached as to form edge grooves, in which may be inserted in the desired order index slips of card or paper, thus making up each index page. Projecting from the lower or inner side of each sheet is a short strip, which extends inward between the adjacent sheets, as shown in dotted lines, when a page is turned out for reference, this strip serving as a guide to hold the sheet in place. Each index page is exposed to view by simply pressing downward upon the ear carrying the proper initial letter, the operation being reversed to return the page to place within the case.

A New Solvent for Cellulose.

BY C. F. CROSS AND E. J. BEVAN.

Hitherto we have had no acid solvent for cellulose but such as in dissolving it bring about marked changes in composition and properties. In dissolving, the cellulose is resolved, *e. g.*, by the action of sulphuric and phosphoric acids, into products of lower molecular weight, and cannot be recovered from the solution. Concentrated hydrochloric acid, as is well known, attacks cellulose profoundly. When digested with the acid in the cold the fibers are completely disintegrated, and the resulting modification, obtained as a white powder, manifests very different properties from the original. When warmed with aqueous solutions of the alkalis it is colored deep yellow, and the products of hydrolysis are powerful reducing agents (aldehyds). Some of the OH groups are also so affected that they react with acetic anhydride at its boiling temperature, giving, so far as our determinations show, the diacetate of a C_{12} compound. We find, however, that on dissolving in the acid one half its weight of zinc chloride, a solution is obtained (of specific gravity 1.44) which dissolves cellulose instantly and without sensible modification.

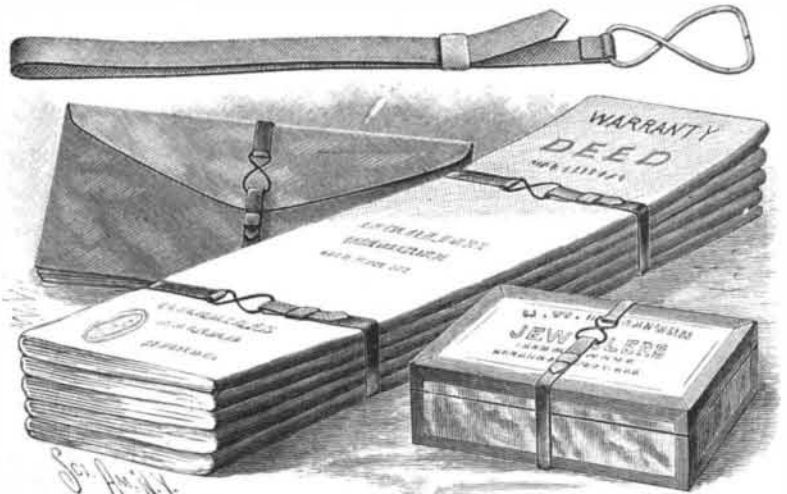
This observation is of importance, as it enables us to investigate some points in the constitution of cellulose for the determination of which such an acid solution is an essential condition. The solution of cellulose obtained by heating it with concentrated solutions of zinc chloride may also be diluted with hydrochloric acid, without precipitating the dissolved products, but the solution by the new reagent has the double advantage of being instantaneous and of being prepared, therefore, with the minimum of resolution of the cellulose into bodies of lower molecular weight which usually attends the somewhat prolonged heating necessary for complete solution in the aqueous solution of zinc chloride.

The reagent we also find of great value in the investigation of structural points, *i. e.*, as an aid to microscopic work in the province of the vegetable fibers. All forms of pure cellulose are rapidly dissolved by the

reagent, and the various stages preceding their final disappearance may be observed under the microscope, the observation throwing much light on structural peculiarities. The raw fibers, *e. g.*, cotton and flax, are not dissolved, at least only partially, but swell up under the action of the reagent, with the result that the structural features are brought out with great prominence. Jute and the ligno-celluloses generally are dissolved by the reagent, and many of the adipo-celluloses also. We are investigating these actions more closely, and hope shortly to publish an account of our observations. In the meantime, we commend the reagent in question to all who are engaged in the chemical or microscopic investigation of the vegetable fibers.—*Chemical News.*

AN IMPROVED PACKAGE TIE.

A tie for packages of documents and other articles, which can be readily and easily adjusted to suit the package, and which will not wear or fray out, as is sometimes the case with twine or tape, is represented in the accompanying illustration, and forms the subject of a patent issued to Mr. E. C. Plumer, of Columbia, S. C. The tie, shown separately at the top of the illustration, is made of a thin strip of pliable metal, preferably sheet copper, to one end of which is attached a bent wire link, the attachment being effected by bending the end of the band over one end of the link, where it may be secured by a small rivet if deemed necessary. The other end of the band is made slightly pointed, and is adapted to be passed through the other

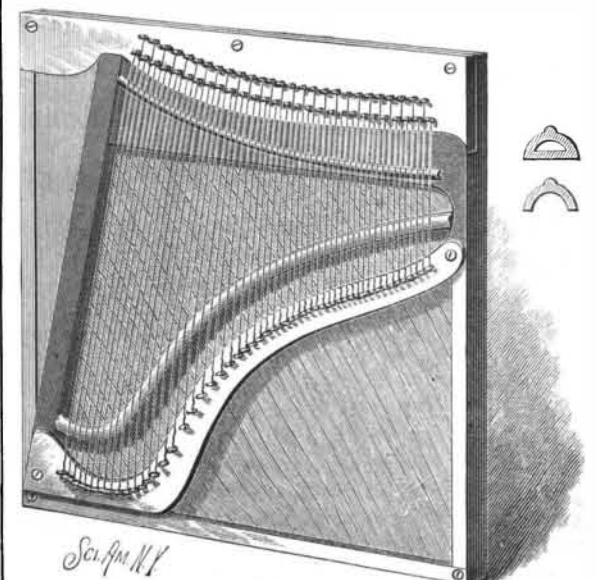


PLUMER'S METALLIC BAND PACKAGE TIE.

end of the link, upon which it is closely bent down when the tie is fixed upon a package, the end being secured, after adjustment, by a confining slide on the body of the band. This tie is comparatively indestructible and presents a very neat appearance.

IMPROVED SOUNDING BRIDGE FOR PIANOS, ETC.

A sounding bridge designed to greatly increase the volume of sound produced by a piano or other instrument in which the improvement is applied is shown in the accompanying illustration. It forms the subject of a patent issued to Mr. Martin Durick, of No. 567 Spring Street, Buffalo, N. Y. The improved bridge consists of a recessed strip of metal, curved in conformity with the wrest plank of a piano, and in cross section forming a hollow convex bridge, as shown in one of the small figures at the side, there being a slight rib or projection in the top surface of the bridge upon which the wire rests. A modified form of this sounding bridge is made with a bottom wall, as shown in the other figure, the bridge then forming a hollow strip of metal. The main view shows the wrest plank with the sounding bridge in position.



DURICK'S BRIDGE FOR STRINGED INSTRUMENTS.