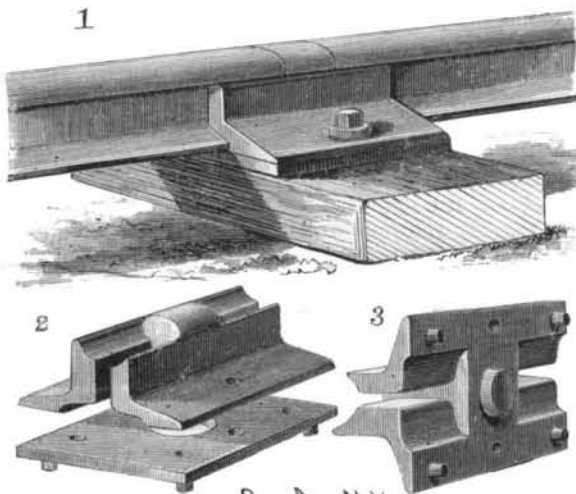


IMPROVED RAIL CHAIR.

The engraving shows a rail chair that prevents spreading and creeping of the rails, and forms good joints. The chair is formed of two side pieces, having their inner sides curved and shaped to fit snugly against the sides of the rail. These pieces are united at the middle by a cross piece extending from top to bottom, and having its top shaped the same as the head of the rail. The recesses between the plates are so shaped that an end of a rail can be passed in between them, the ends of the rails abutting against the ends of the center cross piece, as shown in Fig. 1. The outside plate is slightly higher than the inside one (Figs. 2 and 3), to form a flange for carrying the wheel over the joint. Tenons project downward from the under side of the cross piece and from each end of each side piece, and an aperture is formed in the middle of the lower part of each side piece; the tenons fit in apertures in a bottom plate. Tenons on the under side of



JAKUES' IMPROVED RAIL CHAIR.

this plate fit in holes in the tie. This plate is also provided with apertures corresponding with those in the side pieces, and through which the bolts holding both parts to the tie are passed. The lower ends of the bolts are countersunk in the ties, and elastic washers are placed under the nuts. It will be seen that the chair forms an even joint, holds the rails securely, and cannot creep or give laterally.

This invention has been patented by Mr. George W. Jaques, of Burton, Ohio.

Old Shoes Remade.

It may be a surprise to some people to learn that the old shoes cast into the ash barrels are liable to reappear in the boudoir and parlor. A New York reporter who saw a couple of rag pickers quarreling over a lot of worn out and seemingly worthless foot gear interviewed one of the chiffonniers, and found that they sold them to the manufacturers of wall paper. He followed up the clew, and on questioning the foreman of one of these establishments elicited the following bits of information.

"We buy," said the foreman, "all the boots and shoes that the scavengers can bring us. We pay different prices for the different qualities of leather. A pair of fine calfskin boots will bring as high as 15 cents. We don't buy cowhide boots. The boots and shoes are first soaked in several waters to get the dirt off them. Then the nails and threads are removed, the leather ground up into a fine pulp, and is ready to use.

"The embossed leather paperings which have come into fashion lately, and the stamped leather fire screens, are really nothing but thick paper covered with a layer of this pressed leather pulp. The finer the quality of the leather, the better it takes the bronze and old gold and other expensive colors in the designs painted on them. Fashionable people think they are going away back to the mediæval times when they have the walls of their libraries and dining rooms covered with embossed leather. They don't know that the shoes and boots which their neighbors threw into the ash barrel a month before form the beautiful material on their walls and on the screens which protect their eyes from the fire.

"We could buy the old shoes cheaper if it were not for the competition from carriage houses and bookbinders and picture frame makers. I don't know how many other trades use old shoes and boots, but the tops of carriages are largely made of them, ground up and pressed into sheets. Bookbinders use them in

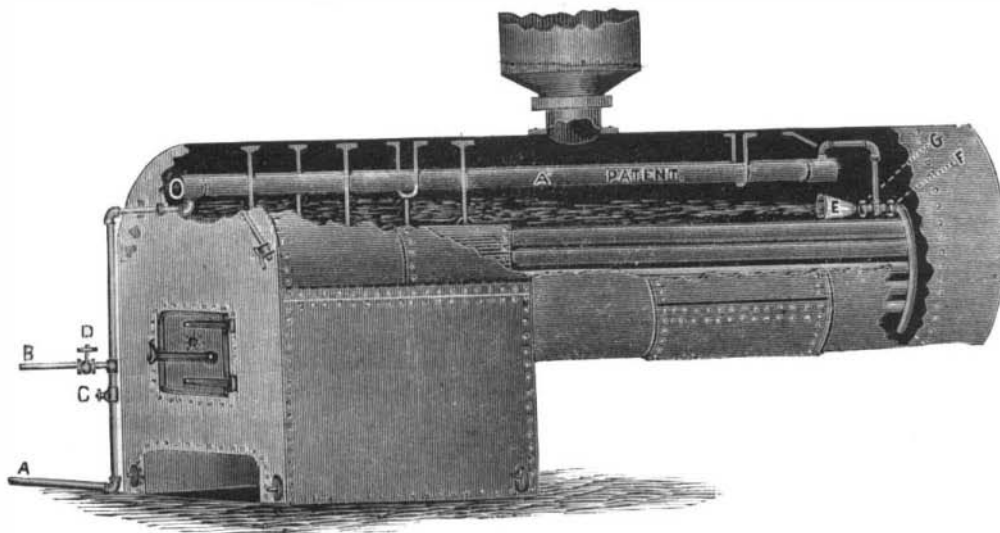
making the cheaper forms of leather bindings, and the new style of leather frames with leather mats in them are entirely made of the cast-off covering of our feet."

Steam for Extinguishing Fires.

The New York Steam Heating Company, who have had their pipes laid under the streets and furnished steam for heating and power for operating all kinds of machinery, in the lower part of this city, are now extending their pipes further up Broadway, and in time they expect to compass the entire city with their heating system. The editor of the *Fireman's Journal*, in a conversation some months ago with the secretary of the steam heating company, was informed that before long the company would be prepared to put out fires in that portion of the city covered by their mains. Recently W. C. Andrews, president of the company, explained definitely the plan they propose to adopt in the dry goods district for putting out fires. He said: "The use of steam for putting out fires is not new. It is in operation in a great many large factories all over the world. There has never been any public system, because the conditions have never existed before under which it could be put in operation. The steam drives out the air and smothers the fire, and does not damage the goods as water does. By putting stand pipes in each building, with four or five inch nozzles on each floor, which could be turned on from the street, the steam could be turned on in any part of the structure. It would be so light adraught on our boilers that I doubt if it would lower the pressure to put out any ordinary fire. The dry goods district contains more inflammable material than any similar territory in the world. It is inadequately protected at present." This might do well enough in confined spaces, but where the air has full access to the flames firemen are of the opinion that the fire would beat the steam every time. Still, we hope the experiment will be tried, for it may be made a valuable auxiliary to the fire department.

IMPROVED BOILER CLEANSE.

The engraving shows a simple and effective scale or sediment remover and preventer, which, being purely mechanical in its operation, does not require the use of any chemicals. The feed pipe, A, is continued in the boiler, either in an annular or plain form, as required, and is fitted with a branch having two check valves, F and G, the former opening with the line of feed, and the latter, which is connected to a skimmer, E, placed at the ordinary water level, opening against it; the feed pipe is continued from the valve, F, to discharge at whatever point (H) required. On entering the boiler the water in the feed pipe begins at once to rise in temperature, and as deposit and precipitation commence at about 250° Fah., all salts and other impurities are gradually deposited on the bottom of the pipe—the feed water, with all light, non-depositable matter, keeping its flow to the discharge point. Then, every twelve, eight, four, or two hours, according to the quality of the water or the rate of evaporation, the blow-off valve, D, is opened for a minute or two, thus causing the check valve, F, to close by the internal pressure of the boiler, and the check valve, G, to open, when the surface scum, oil, and water, rushing back, carry all deposit out of the feed pipe, through the blow-off pipe, B, into tank drain or heater, as may be required. A very small blow suffices to clear everything out, as all the substance to be discharged is located in one place, ready to be blown out. When a slight scale is neces-



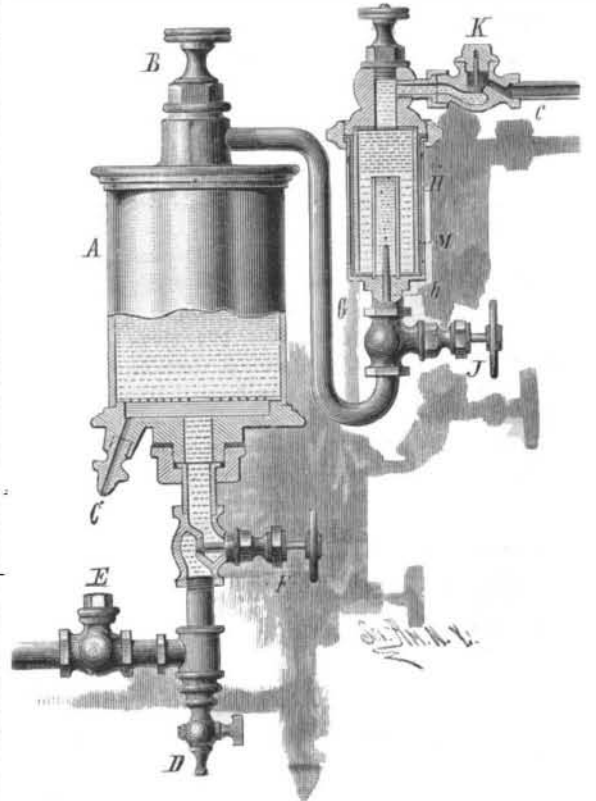
WASS' IMPROVED BOILER CLEANSE.

sary for the protection of the iron, a small portion of the feed water may be permitted to go to the boiler direct through a branch placed between the feed pump and the valve, C. This "cleanser" keeps the water in the boiler pure, separates the foreign matter, and discharges it by means of the oil, scum, and other matter too light to settle.

Further information can be obtained from Mr. J. C. Henderson, agent, 313 Bush St., San Francisco, Cal., or from the patentee, Mr. D. D. Wass, same address.

IMPROVED LUBRICATOR.

In this lubricator, designed for locomotive, marine, and other steam engines, the oil is supplied by the pressure of the steam, and is fed in a fine stream, or drop by drop, by its passage through a fluid of different specific gravity to it within a glass chamber, which admits of the amount of supply being seen and readily



BARCLAY'S IMPROVED LUBRICATOR.

controlled as required. Near the bottom of the cup, A, is a perforated diaphragm with solid center, by which a general pressure on the oil may be obtained. Attached to the cup are a filling cup, B, a cup drain, C, a lower pipe drain cock, D, a check valve, E, in a branch by which steam is admitted from the boiler, a hand valve, F, for regulating the supply of steam to the cup, a pipe, G, for supplying oil from the cup to the indicator or receiver, H, through a small discharge pipe, I, on top of the receiver, a hand regulating valve, J, and a check valve, K, in the pipe, C, which conveys the oil to the engine. The inventor of this lubricator found that by supplying the transparent indicator with a liquid of greater specific gravity than water, preferably an acidulous liquid—such as vinegar, citric, acetic, or sulphuric acid—the feed of the oil in drops was more perfect, and the glass of the indicator retained its transparency for a much longer period, than could be obtained with water, the oil not settling on the glass to the same extent when an acidulous liquid was used. The glass indicator is not supplied direct with the liquid medium, which is held in a glass tube, M, of about two-thirds the height of the outer glass of the indicator. The small oil discharge pipe, b, enters through the closed bottom of this tube, which is of such size as to leave an oil space surrounding it. By this arrangement the outer glass simply contains oil, while the inner contains the denser fluid, and a good working capacity is obtained without interfering with the transparency of the indicator. This lubricator may be easily adjusted to feed any desired quantity, is accurate and reliable, and those which have been in constant use many months present as clear a view of the oil as when first set up.

This invention has been patented by Mr. Peter Barclay, whose address is Cunard Wharf, East Boston, Mass.

Indelible Ink for Paper.

Its indelibility depends on the fact that when bichromate of potassium and gelatine come together, particularly in the form of a thin film, in the presence of daylight, the film becomes insoluble in hot or cold water.

A good formula is the following: Gelatine 2 grs., bichromate of potash 2 grs., nigrosine 10 grs., water 1 fl. oz. Dissolve the gelatine and nigrosine in most of the water, and the bichromate of potassium in the remainder. Mix the two solutions in an amber colored bottle. If it is found that the ink "gums" in the pen, the quantity of gelatine and bichromate may be somewhat reduced. But the ink, when properly made, and dry, cannot be entirely removed from paper by hot or cold water, acids, or alkalis.

The American Association for the Advancement of Science.

The thirty-fourth meeting of the American Association for the Advancement of Science will be held at Ann Arbor, Michigan, from August 26 to September 1. Bar Harbor, Maine, was the locality originally chosen, but as suitable accommodations could not be secured, it was changed by invitation to the University of Michigan. The absence of the students during the summer leaves their quarters available, and no difficulty will be experienced in obtaining ample accommodation. Reduced fares have been obtained, and a special through train will be run from Buffalo on the 25th, allowing two hours at Niagara. A complimentary excursion to the Saginaw Valley will be given during the session. The retiring President, Professor J. P. Lesley, of Philadelphia, will deliver his address on the evening of the 26th. The President-elect is Professor H. A. Newton, of New Haven; Permanent Secretary, F. W. Putnam, Salem, Mass.

Progress in Calico Printing.

Dr. Otto N. Witt, a gentleman well known in the world of color chemistry, has been delivering an address to the Society for the Development of Industry in Berlin, and we select some of the most salient points of his paper, thinking that they will be perused with interest by our readers. The most important improvements have taken place in the field of chemistry applied to calico printing, and the Alsatian industry can be taken as the first brilliant example of what has been accomplished.

To begin with, it is necessary to mention the study of the changes undergone by the cotton, or rather the cellulose, when exposed to certain influences, and to note the observations of Witz, and then of Messrs. Cross and Bevan, on the formation of oxycellulose, with which our readers are well acquainted. The introduction of the alkaline chrome mordant is also of recent date, and so is the alkaline iron solution in glycerine, of which also our readers have not failed to take notice when we published accounts on same some time ago. The manganese styles are not so much used as they used to be; and the manganese brown is now principally used as a kind of mordant for fixing deep shades, by means of sulphate of aniline or naphthylamine or other organic aromatic amines, to obtain a ground on which white or colored discharges are produced. The colors produced by this means are all fast against light, air, and soap. Great variety of shades can be produced by employing the amines on goods previously prepared with manganese brown; for instance, if the goods are treated with sulphate of aniline, a black can be formed, while sulphate of naphthylamine produces a red brown color, which has not been as yet well studied, but which is accepted as being similar to aniline black. Beta-naphthylamine, under the same circumstances, produces a brown which is not easily distinguished from the original manganese bister brown, but which has the advantage that it cannot be altered by reducing agents. Other basic products have been tried for the same purpose, and it is likely that some of them are used, although their employment is kept secret. The employment of indigo in printing is next mentioned, and the well known methods of producing patterns by resisting and discharging are shortly described, and special reference is made to Koechlin's method of discharging by printing a thickened solution of a neutral chromate and afterward passing through a weak, warm bath of sulphuric and oxalic acids, the latter being employed in order to decompose the free chromic acid which is formed, and which, after having destroyed the indigotine, if not removed would tender the cloth; this is of course for white discharges, while light blues are produced by employing a weaker chromate color, and colored discharges by printing principally, along with the latter, any pigment in connection with albumen, which is coagulated by the acid bath and the colors thus fixed on the fiber, while at the same time the indigo is discharged. The discharging by means of chlorate of alumina is useful for fixing at the same time the aluminic mordant on the cloth, which is then capable of taking up alizarin and thus produce blue and red designs.

The now well known process of printing with natural indigo by the Schlieper and Baum process is brought under notice, and its advantage described. Of course alizarin blue is also mentioned; as also indophenol, which has found very little employment in calico printing, while it has been found very useful in woolen printing for producing red and blue patterns in connection with the azo reds. For this purpose the reduced indophenol blue has the property of destroying the azo scarlets, and of this discharging power of the blue paste it is taken advantage in order to produce red and blue effects, which are very much liked on woolen goods. Of the other indigo substitutes employed in calico printing the author mentions the one derived from logwood, and about which there still seems to be very much mystery in the minds of some chemists, although it is produced by a very simple process.

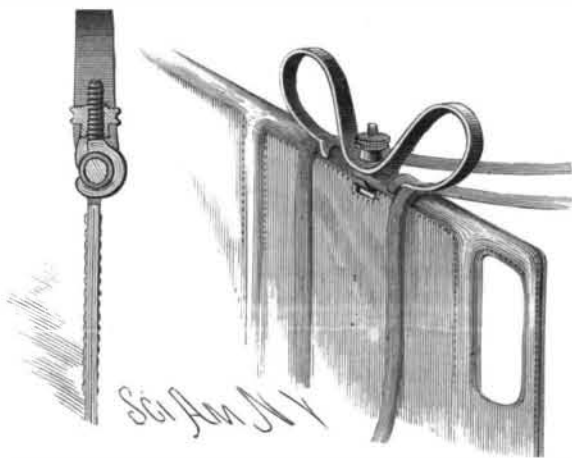
Gallocyanine has been found pretty useful in print-

ing and in connection with Persian berries, as another of the many and yet unsuccessful competitors as substitutes for indigo. Galleine and ceruleine are next passed in review, and induline, which latter is now printed in paste form by means of methyltartaric acid. By steaming, the methyltartaric acid is decomposed, the free alcohol produced dissolves the induline, and fixes it on the fiber as a pigment. Of the red coloring matters the author mentions, besides alizarin, the new bisulphite derivative of azo scarlets, the so-called azurin, which, he states, yields pretty fast shades by means of acetate of alumina, and for the production of yellower tone the employment of a new yellow azo color is recommended, the flavophenin, which goes on cotton in a simple soap bath and yet produces shades which are stated to be fast.

In late years great attention has been paid to such coloring matters as can be fixed on cotton without any preparation, and canarin and Congo red belong to this class. In conclusion the author mentions the formation of the cadmium yellow and the chrome yellow, which stand sulphur fumes, as well as the steam chrome yellow in connection with citrate of ammonia. —*Tex. Mfr.*

REIN HOLDER.

This simple device for holding the reins on the edge of the dashboard has been patented by Mr. George O. Teeter, of Teeterville, Ontario, Canada. A steel strip is bent upward from the middle to form two open spring loops, the free ends of which are brought back to near the middle of the strip, the ends being formed with flanges bent to fit on the top rod of the dashboard. The middle of the strip is apertured to receive the threaded shank of a hook on which a thumb nut, resting on the upper surface of the strip, is screwed. The strip being placed upon the rod of the dashboard (the hook catching the rod as shown in the sectional view),



TEETER'S REIN HOLDER.

the nut is drawn up tight, whereby the middle of the strip and free ends of the loops are pressed firmly on the top of the dashboard. The flanges prevent the ends of the loops from slipping off the top edge. The reins are pulled in between the bottom free parts of the loops and the top edge of the dashboard, where they are securely held.

Naphthol.

The extraordinary power of naphthol as an antiseptic and disinfecting agent has been known for a long time, but its disagreeable smell and the difficulty of preparing it in a purified state, with the occasional toxic action of the crude naphthol, have been a bar to its use as a remedial and antiseptic agent. Justus Wolff, a chemist interested in coal tar products, has recently succeeded in producing it in a pure and odorless state in well defined crystals, and claims its antiseptical action is much greater than that of carbolic acid. Recent research has demonstrated that the toxic effects of crude naphthol were due to the impurities it contained. Dr. Shoemaker, of Philadelphia, in a paper read before the Philadelphia County Medical Association, on the Medical Use and Value of Naphthol, conclusively proved the non-poisonous character of the purified or odorless naphthol by taking large doses internally. It has no corrosive action on the skin, and will not injure textile fabrics.

As a remedial agent it acts with greater efficiency, and has many advantages over carbolic acid; the fact of its being absolutely odorless will make it a desirable substitute. It is expected that it will shortly be produced on a manufacturing scale as a substitute for carbolic acid.

PROF. HUXLEY, who has been ill for several months past, is about to retire on a well earned pension from his duties at the South Kensington Museum. Mr. Huxley has seriously overtaxed himself, and his malady is nervous prostration, from which it is hoped by his friends that he may be speedily relieved. If the complete rest which he now consents to take should fail to restore his impaired health, he will also retire from the presidency of the Royal Society next November.

Alarm Photometer.

An ingenious automatic method for signifying the rate of consumption of candles used in photometrical work has been devised by Dr. Hugo Kruss, of Hamburg, for the gas examiners of St. Petersburg, and has been recently described and illustrated in the *Journal für Gasbeleuchtung*. The arrangement is very simple. The candleholder is hung in an unequal arm balance, as in the Sugg-Letheby photometer, in the position required for making an observation. The beam of the balance has a long pointer hanging down from the fulcrum, which marks the position of the balance on a vernier scale at the foot of the pillar. There are, as usual, two metallic pins at the two opposite ends of this scale; and in the middle a movable pin which is in electrical connection with a battery and a bell. Directly the pointer comes into contact with this pin, the circuit is completed and the bell rings. The method of using the balance is readily understood. The candles, being lighted and fixed in position, are weighed until the pointer just swings clear of one stud of the vernier, when any desired weight may be placed in the pan provided for the purpose underneath the candles, the clock being started at the same moment. Observations may then be taken while the candle burns; and the instant the weight placed in the pan is lifted by the consumption of the candles and the weight in the opposite pan, the pointer swings back and touches the pin, which completes the circuit and so rings the bell. This, of course, indicates, in conjunction with a glance at the clock, the precise rate of consumption of the candles, without touching or in any way interfering with them. The arrangement is a very neat one; the battery, electro-magnet, and bell being mounted on the balance stand, and all contacts being so placed as to be readily removed out of the way when not required. For this a special form of cell is used, with an arrangement for preventing waste when not required for the purpose specified.

Hints for Buyers of Machinery.

Messrs. R. Hoe & Co., the well known printing press builders, give the following practical suggestions, intended without doubt to apply to the purchaser of printing presses, but their hints are equally pertinent to other classes of machines:

"In buying a machine see that, whether new or second hand, it is strong and well made. Consider the standing of the maker, both as mechanic and machinist. A light framed or shakily fitted machine will be dear at any price. Do not be deceived by any beauty of paint or finish on exposed work, which adds nothing to the usefulness of the machine, and which may draw the eye from an examination of the working parts. Uncover the boxes, and see whether the finish of shafts in their bearings, of journals, is as smooth and true as the white and brass work of more exposed pieces. Take out, here and there, screws and bolts; see if the threads are deep, sharp, and well fitted. Look closely at the fitting of all toothed or pinion wheels; note whether they have been cast and filed to fit, or whether they have been accurately cut by automatic machinery, so that they will fit in any position. Slowly turn pinion wheels, and note whether there is any rattling or lost motion, or whether the teeth fit snugly, yet freely, so as to give even, steady motion. Closely examine all castings for pin-holes or air bubbles, which may be most easily detected in work that has been planed. See that castings are heavy as well as solid. Look after oil holes and provisions for oiling. See that the castings are neatly fitted; that they do not show the marks of the hammer or file, which must be used to connect them if they have been forced or badly put together. Pay attention to the noise made by the machine when in motion; if fairly fitted, the noise will be uniform; if badly fitted, it will be variable or grating."

Eating Lemons.

A good deal has been said through the papers about the healthfulness of lemons. The latest advice is how to use them so that they will do the most good, as follows: Most people know the benefit of lemonade before breakfast, but few know that it is more than doubled by taking another at night also. The way to get the better of the bilious system without blue pills or quinine is to take the juice of one, two, or three lemons, as appetite craves, in as much ice water as makes it pleasant to drink without sugar before going to bed. In the morning, on rising, at least a half hour before breakfast, take the juice of one lemon in a goblet of water. This will clear the system of humor and bile with efficiency, without any of the weakening effects of calomel or Congress water. People should not irritate the stomach by eating lemons clear; the powerful acid of the juice, which is always most corrosive, invariably produces inflammation after a while, but, properly diluted, so that it does not burn or draw the throat, it does its medical work without harm, and, when the stomach is clear of food, has abundant opportunity to work over the system thoroughly, says a medical authority.