IMPROVED BACK-WASHING MACHINE.

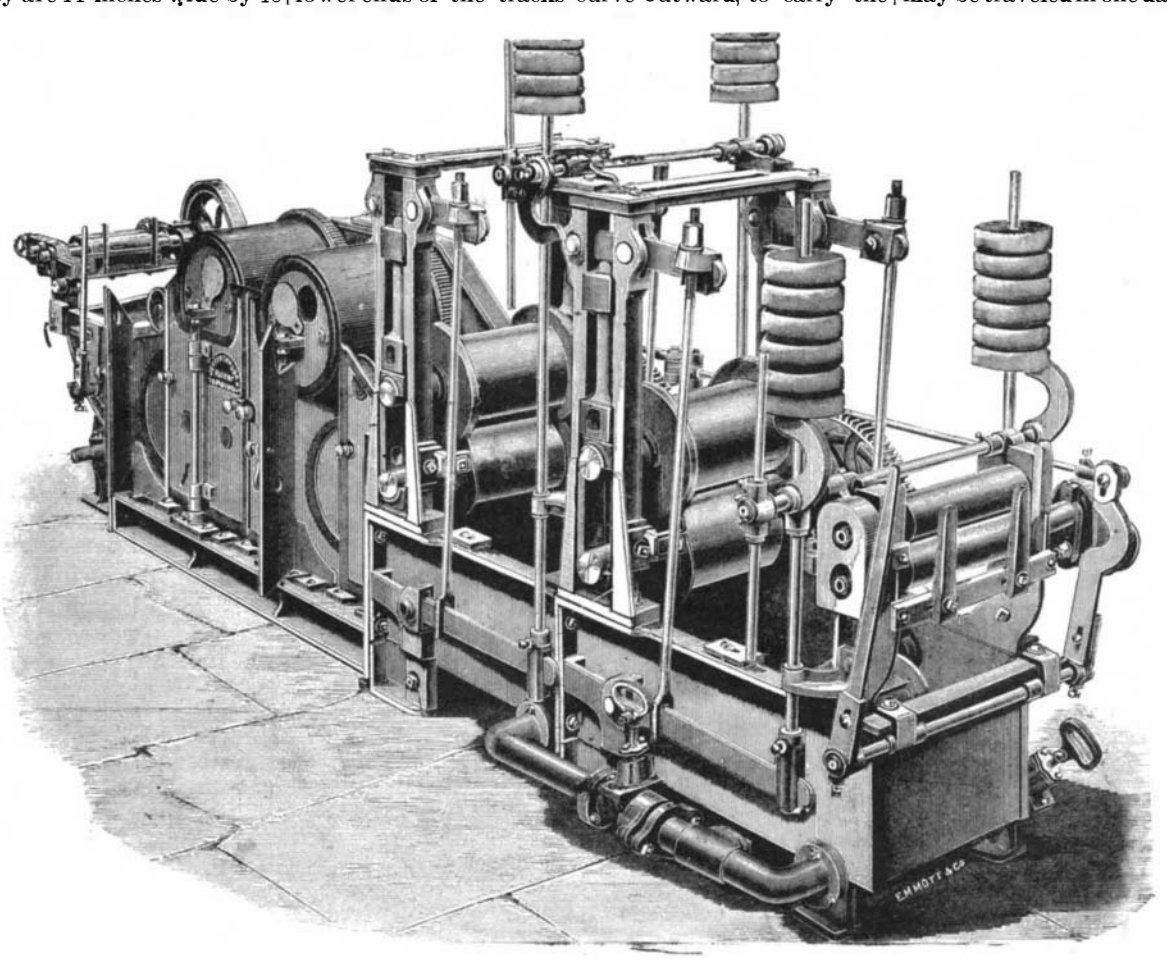
The object of back-washing is to remove the oil that has been introduced into the wool for the carding operation, and the object should be to remove it as effectively as possible. It is maintained by Messrs. Jefferson Brothers, of Bradford, England, makers of the machine here shown, that when worsted coats, etc., wear shiny, it is in a large part due to the oil and grease left in with imperfect washing and back-washing, and they accordingly improve the operation by squeezing four times instead of twice as formerly, viz., they squeeze first with a wet nip, or immersed in the wash liquor, then with a dry nip, then with a wet one, and lastly with a dry nip, after which the slivers pass to the drying cylinders. Says the *Textile Manufacturer*, there can be no mistake about it, but that the theory of the wet nip is the correct one to work upon. It may be well explained by the washing of a lump of wool thoroughly impregnated with dirt or sand. The way we would do this naturally would be to take it, immerse it in the suds, and still keeping it immersed to squeeze and relax it as often as required. This corresponds with the wet nip, the act of squeezing in the presence of plenty of suds or liquor greatly facilitating the removal of dirt. The equivalent for the dry nip is to lift the wool out of the suds, allowing the surplus liquor to flow away, and the material to partly dry, sadden, and cool, and then to squeeze it. Now, when wool partly dries by this means, it becomes more compact, and the dirt it contains is retained by the squeezing, instead of being expelled by the suds.

Another great advantage of having the first dip under the level of the water, as shown in the diagram herewith, is that the slivers are not lifted through the scum and dirt floating on the water in the usual way, and therefore do not carry any with them to the second or the dry nip. The streakiness so often seen when slivers have been back-washed in the common way is thus entirely obviated.

The washing part of the machine has two suds bowls connected by a pipe and injector, so that when the water in the bowl, into which the wool first passes, becomes too dirty for use it is discharged, and the water from the second bowl is then put into it, and a fresh supply of suds is made in the second bowl. Each bowl is fitted with the double squeezing head, that is, the slivers are washed and squeezed once in both bowls, each time with a wet and a dry nip. Of course the number of slivers are, as usual, varied according to requirement, and may be of any kind of material, either of short, medium, or long wool. The wool after leaving the rollers passes on to the drying cylinders, which are arranged in two tiers in order to save length in the machine. In dimensions they are 14 inches wide by 18 inches diameter, and it will be noticed that on one side they are free and open, an improvement which allows of better access to the slivers upon them. The side toward the reader are the free ends; they are, however, covered with hinged doors up to about half the height of the upper cylinders, for the purpose of keeping to the slivers as it passes out the hot air heated as we have already described in the economizers below.

The drying cylinders have a notable improvement in their construction which we thinks deserves adoption in other drying machines. The usual, or old, mode of constructing these is of stout tin plate, sheet iron, or sheet copper, also the cast iron, with stuffing boxes to make the joints steam tight, and buckets inside the cylinders to remove the water due to condensation. This plan gives trouble by leakage at the glands, which are, however, entirely done away with in Messrs. Jefferson's arrangement, which is also enabled to work with much less steam, as the center of the steam jacket is cast hollow, and there is no steam in the center, about one-quarter being in fact in use.

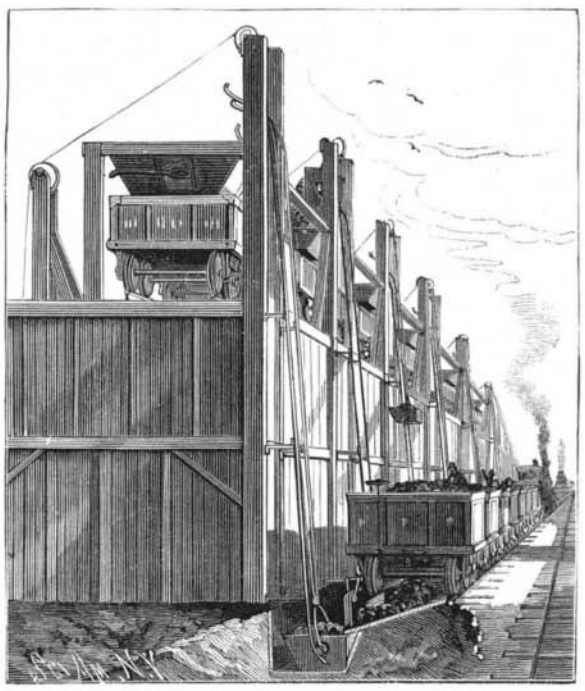
The improvement consists of an annular cast iron casting, or jacket it may be called, fixed to the frame of the machine and fitted with the necessary steam and exhaust or drain pipes. The inside of this casing or jacket is filled with steam which heats the material of which it is composed, and also the revolving cast iron shell or sleeve placed upon it. The slivers are dried by contact with the latter, and also by the heated air from the economizers below. The latter are heated by the exhaust steam; the air is obtained from a fan placed at the back end of the machine near the can motion.



IMPROVED BACK WASHING MACHINE.

UNLOADING AND ELEVATING APPARATUS.

The apparatus is constructed with a chute below a railway track, and beneath which is a pit into which an elevator bucket, running on tracks of a frame, may



McNELLY'S UNLOADING AND ELEVATING APPARATUS.

pass. The material is raised by the bucket, and discharged into a hopper supported on the frame over tracks on which transfer cars run. Fitted at the outer end of the chute, and provided with suitable mechanism by which it may be opened to let the coal or other material fall into the pit, is a gate. Extending upward from the pit are tracks, curving inward at the top to allow the side rollers of the bucket to move inward as it dumps its load into the hopper fixed to the trestle, so that the cars can be run below the hopper to be loaded. The bottom of the hopper inclines toward an outlet closed by a sliding gate. The hoisting rope connected to the bucket passes over a pulley on top of the frame posts, and then to the winding drum. The lower ends of the tracks curve outward, to carry the back of the bucket well underneath the end of the chute.

The bucket, having been filled by opening the chute gate, is raised by the rope until it strikes the hook heads of elastic or yielding trip bars secured to the frame posts; continued hoisting of the bucket carries it inward on the curved ends of the tracks, and causes it to tip to discharge its load into the hopper, the trip bars yielding backward to allow the front of the bucket to stand well within the hopper. It will be seen that coal may be quickly removed from the railway cars, and be elevated and transferred to any desired point in the yard below the trestle without hand shoveling.

This invention has been patented by Mr. M. J. McNelly, whose address is care of Messrs. George W. Bush & Sons, of Wilmington, Del.

Ex-Governor Stanford's Educational Projects.

In a recent interview with a reporter, Ex-Governor Stanford, the California millionaire whose only son died in Paris about one year ago, outlined some of his plans for establishing educational institutions at Palo Alto as a monument to the memory of his son. The memorial university will not only afford opportunities for learning to the youths of that State, but will be open to students from all parts of the Union. In addition to the university colleges for young men and women, high schools for boys and girls will be founded, to be attached to them. Mr. Stanford also intends to carry out the wishes of his son, and found an institution almost similar to the Cooper Institute of New York. It will also be used for the advancement of science and art, with evening classes for mechanics and youths. There will be a school of design, a polytechnic school, galleries of art, collections of models, of inventions, etc. Gov. Stanford has been elected United States Senator.

Hints to Inventors.

The long winter evenings are now at hand, and afford an opportunity for those of an inventive turn to put their ideas into practical shape by perfecting devices that they have had in mind, or to cast about for something new on which to exercise their genius. Many laundries have reduced their regular working forces, and ingenious employes, who will be idle for some months, can make good use of their time by studying the wants of the public in the way of improvements in their line, and supplying these wants.—*National Laundry Journal.*

New Ship Canal.

A steamship route between Harwich and Liverpool, for some reason to be called the Ipswich and Birmingham Ship Canal, is the subject of a pamphlet by Mr. Joseph Robinson. "It is estimated that 70,000 men would be required to complete the canal in seven years. The length of this canal would be about 200 miles; the estimated cost, £50,000,000. For the purpose of raising the vessels from one level to another, it is intended that inclined planes should be constructed in place of locks, excepting Ipswich lock, so that the steamships may continue from station to station without stopping, if required, so that the whole length of that canal (200 miles) may be traveled in one day, including such stoppages. It is intended that locomotive engines shall be employed for the purpose of towing the vessels through the canal. For this purpose rails 4 feet 8½ inches gauge are to be laid on each bank of the canal.

The canal will be divided into seven sections, as follows: Section A, or Ipswich district, 35 miles of canal; Section B, Cambridge district, 30 miles; Section C, Bedford district, 30 miles; Section D, Northampton district, 25 miles; Section E, Birmingham district, 25 miles; Section F, Wolverhampton district, 30 miles; Section G, Liverpool and Manchester, 30 miles. Each ship or string of small boats will be towed through each section of the canal in about two hours. A locomotive engine will be attached to the vessel running on the bank of the canal. For example, a vessel arriving at Ipswich from the east, the engine would be attached and the vessel would be towed to Cambridge, thus completing Section A. The locomotive would be uncoupled from the vessel and return to Ipswich, if required, receiving information by telegram where to meet the next vessel—at Ipswich or Cambridge. A second locomotive would tow the vessels on Section B—that is, from Cambridge to Bedford—changing engines in like manner on each section of the canal, allowing the vessels time to take in goods or passengers at each of the seven stations, if required."

Mr. Robinson thinks the government might help by furnishing the Canal Commissioners with 50 millions sterling.

Composite Portraits.

At the Newport meeting of the National Academy of Sciences, Prof. R. Pumpelly read a paper "On an Experimental Composite Photograph of the Members of the Academy," illustrating it by photographs of several groups of the members, and also by photographs of engineers employed on the northern transcontinental survey.

This paper was in the direction of the experiments first instituted by Francis Galton, and described by him in his book "On the Existence of the Human Faculty." Galton's experiments seemed to indicate the possibility of obtaining type-pictures of different types of different persons and characters.

These pictures are obtained by taking the photographs of a number of different individuals of the type to be compared, in as nearly as possible the same position. These pictures are then photographed on the same negative, being superposed one on the other, and each photograph being exposed for only a very short time, so that the resultant contains and combines all the features which the different photographs possess in common, but eliminates those which are due solely to individual peculiarities. The pictures are focused on the eyes; and since the distance in eye differs in different persons, some indistinctness about the borders of picture is inevitable. The mouth especially appears to lack decision, by reason of being somewhat blurred; yet on the whole the composite picture is such a one as would be at once recognized by most persons as a fair illustration of such a kind of person as the individuals which compose the class under observation.

It is by somewhat such a process as this, in fact, that Prof. Pumpelly thinks that we usually form a mental image of different types and classes, whereby we recognize, for instance, at sight a Chinaman or an Indian.

The pictures of members of the Academy showed in one instance a compound formed from thirty-one individual members. This picture may fairly be taken as a type-picture of the average scientist or the ideal intellectual man of the Caucasian type, being composed as it is of individuals the most eminent in America in various lines of scientific research. It shows, as must have been expected, a high and massive forehead, and that well known though indescribable cast of countenance which we all pronounce at once, without perhaps being able to assign any reason for it, to be intellectual, so that on seeing a countenance of this stamp we naturally infer that it is that of a professional man.

It was observed, however, that the faces of three of the persons thus combined differed largely from the average type, and in the subsequent experiments these three photographs were omitted for the purpose of securing greater clearness in the result, notwithstanding that the exposure of each picture to the camera was only two seconds, out of the total exposure of sixty-two seconds for all, so that the peculiarities of individual pictures would make only a very feeble impression on the combined photograph. The remaining twenty-eight pictures, then, were divided into two groups, and classified, according to the department of science most affected by the members, into sixteen naturalists and twelve mathematicians.

On combining the mathematicians into one group and the naturalists into another, it was seen that, with apparently the same height of forehead, the mathematicians have a broader, and the naturalists a slightly narrower, forehead than the average.

Prof. Pumpelly spoke at some length of Galton's experiments, by which he has obtained type-pictures of burglars and of other classes of criminals, of engineers, of persons suffering under certain form of disease, such as consumption, of family groups, etc.

He intimated that it was his intention to prosecute these inquiries in the direction of composite profiles, which he expected would produce some startling results. He regarded this as a method of much value in anthropological work.

Major Powell stated that the same method had been applied to obtain a composite photograph of crania at Washington, but without success.

Other members of the Academy, however, indorsed Prof. Pumpelly's views.

Prof. Peirce thought it particularly desirable to obtain a composite photograph of musicians, and also of mathematicians who were devoted exclusively to mathematics, remarking that the members of the Academy represented were not of that exclusive mathematical type which he regarded as a very peculiar one.

Uses of a Common Paraffine Taper.

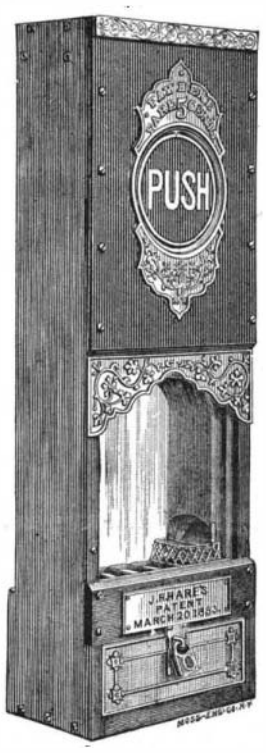
A common white paraffine taper makes, I find, one of the best bougies for exploring the nasal cavity. I use a taper of from one-eighth to one-sixth of an inch in diameter, and about ten inches in length. For mere exploration I round off the end that is to be introduced into the nasal cavity, bend the taper into an easy curve, make it slightly soft by warming it in my hand, and then have it ready for use. The perfect smoothness of the surface of the bougie thus formed, the ease with which it bends, and the just sufficient strength given to it by the wick, are qualities which make this simple, inexpensive, and always ready instrument very effective. From its color it is also readily discernible in the throat when it is passed into the pharynx.

The taper has other uses. If it be wished to apply iodine evenly to the whole of the nasal cavity, the thing can be done at once by means of the taper. It is merely necessary to paint the end of the taper for a couple of inches with iodized colloid or with tincture of iodine, and then introduce it, to secure that all the iodine is left on the mucous lining of the nasal cavity. In ozena, patients can be taught to carry out this method for themselves at stated times. I have two patients now who have done this with the best effect.

The taper admits of another useful application. If the cotton within it be nicely teased out at one end of a short length, the cotton makes one of the most convenient of brushes for applying iodine or other solutions to the throat. In scarlet fever and other affections attended with throat complication, I invariably instruct the nurse or attendant to be provided with a few tapers of different sizes, and to make them act as the brush for applications to the throat; and as soon as one brush has been used, to cut it off with scissors, burn it, and make another. The same kind of brush can be used with equal advantage for cleaning the tube after the operation of tracheotomy.—*Dr. Richardson.*

IMPROVED CAR FARE BOX.

The accompanying illustration shows a novel and useful improvement in car fare boxes. It will be seen that instead of a slit or hole in which to deposit the fare, a door is provided that allows the entire hand to be thrust into the box, the deposit sliding down a funnel-shaped receptacle into the end compartment of an endless chain of boxes. The fender surrounding the first division prevents the money from jumping over into the adjoining box. Each successive deposit moves the belt one space, and dumps one fare into the box below; the deposits are kept separated, and at all times the last five are visible. A bell on the outside of the box notifies the driver of each deposit. No lamp is required for this box, as a small reflector is so arranged as to throw the rays from the headlight down into the interior. The apparatus takes up no room, outside or inside, being flush with the sides of the door frame. The driver, being relieved of the trouble of watching and dumping the fares, can give more attention to the picking up of passengers, etc. It is impossible to rob the box with waxed strings or like devices, as upon opening the door for that purpose the fare passes out of reach, and only an empty compartment is presented.



This invention has been patented by Mr. J. R. Hare, of 63 W. Fayette Street, Baltimore, Md., who will furnish further particulars.

Darkening Oak.

To render new oak wainscoting and oak furniture dark, and give it an antique appearance, we have it from good authority that ammonia is the cleanest, best, and cheapest material that can be used. The liquid stains commonly used are apt to raise the grain of the wood, make it rough, and it is with difficulty evenly applied, whereas in the use of ammonia it is simply the fumes that color the wood, and do it so completely that it is difficult to tell whether the wood is really new or old.

A correspondent in the *English Mechanic* gives the following process of treatment, which he considers the best, after trying the various other processes used by builders and cabinetmakers to darken woods: "Oak is fumigated by liquid ammonia, strength 880°, which may be bought at any wholesale chemist's at 5s. a gallon. The wood should be placed in a *dark* and *airtight* room (in a big packing case, if you like!), and half a pint or so of ammonia poured into a soup plate, and placed upon the *ground* in the center of the compartment. This done, shut the entrance, and secure any cracks, if any, by pasted slips of paper. Remember that the ammonia does not touch the oak, but the gas that comes from it acts in a wondrous manner upon the tannic acid in that wood, and browns it so deeply that a shaving or two may actually be taken off without removing the color. The depth of shade will entirely depend upon the quantity of ammonia used and the time the wood is exposed. Try an odd bit first experimentally, and then use your own judgment."

A Large Price for a Bible.

A Bible was sold at auction in London the other day for three thousand nine hundred pounds sterling (about $19,500). It was knocked down, after spirited bidding by a number of contestants for the book, to Mr. Quaritch, a dealer in rare works, and is believed to be the highest price ever paid for a single copy of any book at auction. It is known to bibliophilists as the Mazarin Bible.

The title is derived from the fact of a copy having been discovered in the library of Cardinal Mazarin in Paris, about the middle of the eighteenth century, and it is generally assumed to have been the earliest printed book. There are said to be eighteen of this edition in existence, one-half of which are in public libraries in Europe.

The copy for which Mr. Quaritch bid such a wonderful price is described in the *Art Age* as "magnificent." It is printed in double columns in type similar to Church script, and is "splendidly" bound in blue morocco. The Mazarin Bible is without date, and is variously ascribed to the years 1450, 1452, and 1455. A copy preserved in what used to be called the Royal Library at Paris contains a note stating that it was completed "in binding and illuminating" in the year 1456, which would put the probable date of printing at twelve months earlier. According to the catalogue of the Syston Park Library, the Mazarin Bible is printed with metal types. Typefounders, however, have differed on that point among themselves, some contending that it was compressed from wooden blocks, others declaring for letters cut in metal, and a third party deciding in favor of cast letters, the last in every material respect like those now in use. But, whatever kind of type may have been employed in producing the earliest printed book, it would, even at the present time, be accepted as a noble specimen of the typographic art.

The printing of the Mazarin Bible is ascribed to Gutenberg, but the fact, we believe, has never been established beyond a doubt. Mr. Quaritch, in an interview with a newspaper reporter after the sale, said that three out of the five copies of this edition of the Bible known to be owned by private parties had passed through his hands, the first being purchased by him when a young man for £590. "The present copy," Mr. Quaritch went on to say, "I have also bought for my stock, and it is purely a speculation of my own. I do not expect to keep it long."

Nova Scotia Heard From.

The Yarmouth (N. S.) *Times* thus discourses on the merits of the publications issued from this office:

"We have received the SCIENTIFIC AMERICAN Hand Book for 1885. It is a beautifully gotten up little book, filled with most valuable information for inventors and others seeking information about patents and the course to pursue in securing or renewing patents. The SCIENTIFIC AMERICAN and SCIENTIFIC AMERICAN SUPPLEMENT are certainly the best papers of the kind published on the continent, and take a front rank throughout the whole world. The student of scientific subjects and all kinds of mechanics will find the paper invaluable. Inventors and those interested in the wonderful inventions which are daily brought before the world can find no better way of keeping themselves informed than by reading these papers. The articles are all written in such a way that all can understand them, and no better engravings of the kind are made than those illustrating these articles. In a growing manufacturing community like Yarmouth such periodicals should be in the hands of every one, and the prices of subscription are so low as to be within the means of the poorest."

We are waiting to hear further from Yarmouth.—ED.

Medical Advice by Telephone, as Related in One of our Medical Journals.

Husband—My wife has a severe pain in the back of her neck, and complains of a sort of sourness in the stomach.

Physician—She has malarial colic.

Husband—What shall I do for her?

[The girl at the "central" switches off to a machinist talking to a sawmill man.]

Machinist to Husband—I think she is covered with scales inside, about an inch thick. Let her cool down during the night, and before she fires up in the morning, take a hammer and pound her thoroughly all over, and then take a hose and hitch it to the fire plug, and wash her out.

Husband has no further need of this doctor.

Danger in the Water Trough.

The *British Medical Journal* suggests a danger to horses at public drinking troughs. It believes that glanders are spread among horses in this way, and recommends a stand pipe and bucket as the safest and best arrangement for watering animals in cities. It is more comfortable for the horse, who has not to strain his neck against the collar to reach the water, the water is fresher and more palatable, and there is far less danger of its being contaminated with dust, dirt, and the germs of disease.