IMPROVED BACK-WASHING MACHINE.

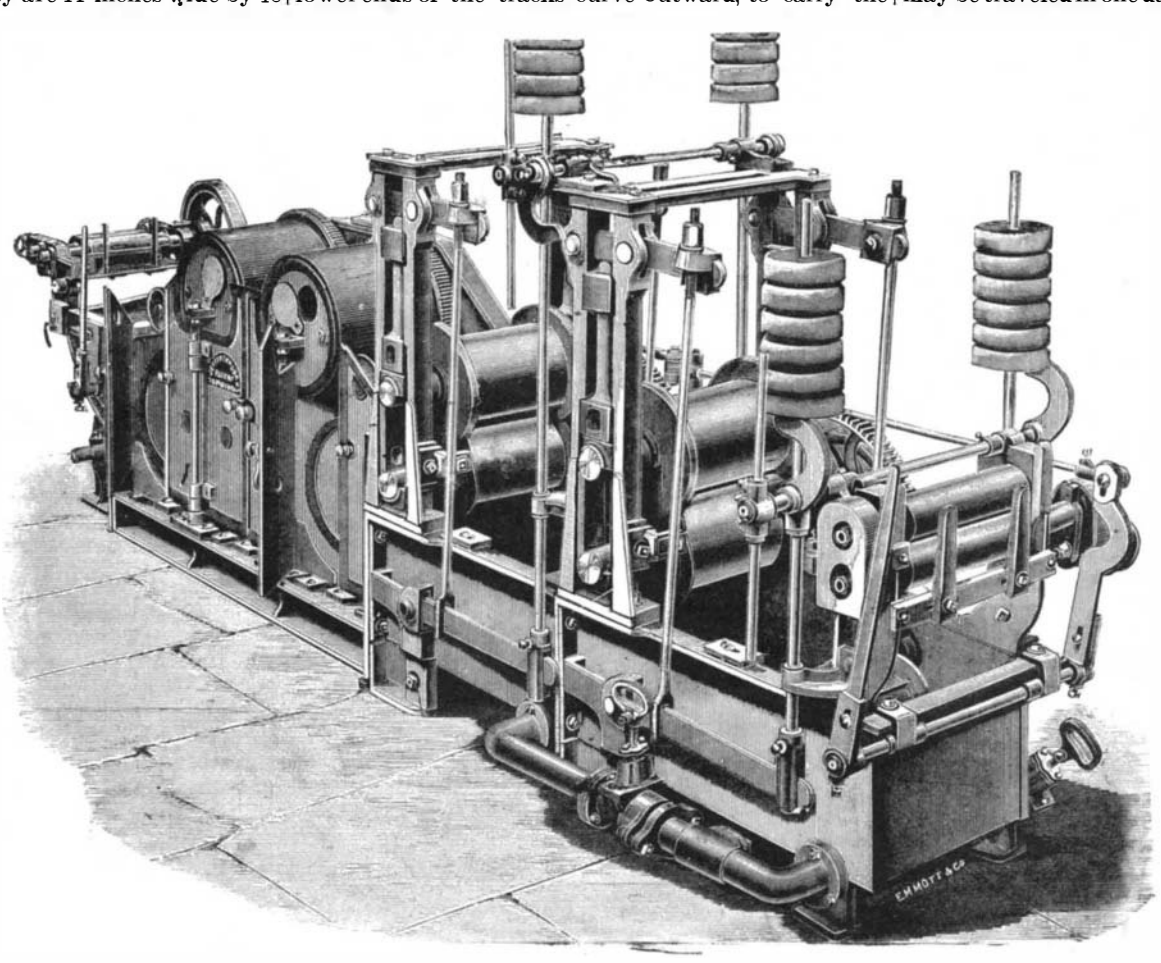
The object of back-washing is to remove the oil that has been introduced into the wool for the carding operation, and the object should be to remove it as effectively as possible. It is maintained by Messrs. Jefferson Brothers, of Bradford, England, makers of the machine here shown, that when worsted 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.

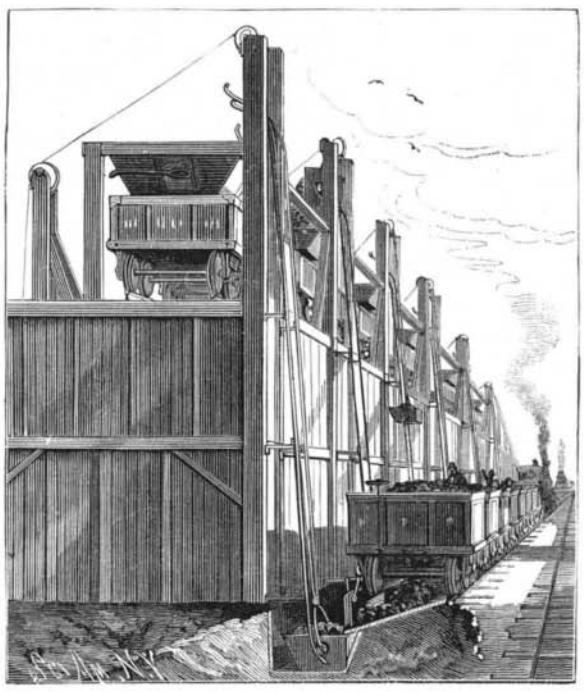
The improvement consists of an annular cast iron casting, or jacket it may be called, fixed to the frame of the machine and fitted with the necessary steam and exhaust or drain pipes. The inside of this casing or jacket is filled with steam which heats the material of which it is composed, and also the 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 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.



McNELLY'S UNLOADING AND ELEVATING APPARATUS.

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.