

fact that throughout the world American products in this branch of industry are more highly esteemed and fetch a materially higher price than those of any other country.

Enormous Public Works in France.

While England is groaning under the effects of a commercial depression which promises to be of long continuance, France, though it has its share in the general stagnation of trade, is occupied with gigantic projects for public improvements. The Republic, scarcely less than the Empire, adopts the paternal theory of government, and is setting itself to work to add incalculably to the means of internal intercourse and the facilities for commerce while providing employment for its laborers.

This theory of government is by some considered to be a false one, but it can be easily shown what can be done under it in the direction of public improvements. So the drainage of Haarlem Lake was done, and that of the Zuyder Zee in Holland is now being done by the Dutch government, which guaranteed the investments made by the capitalists. The only question to make such governmental management successful is whether honest men can be found to direct it. Unfortunately, as the majority of our government employes are politicians, and these, as a class, cannot be quoted as examples of honesty and disinterestedness, it is better for us to keep the government entirely out of all such enterprises, which experience has proved can be done quicker, cheaper, and better by private contract.

M. de Freycinet, the Minister of Public Works in France, has outlined a scheme of railway, canal, and harbor extension, for 1879, which will cost the enormous sum of \$800,000,000, and will probably have legislative sanction for it in its entirety. The money for these unparalleled works he proposes to raise by an issue of three per cent bonds, redeemable in seventy-five years; and that he can get the whole amount without trouble the experience of all recent French loans affords abundant proof. The new chance for investment is eagerly awaited by capitalists, large and small; for enormous sums are now lying idle in bankers' hands.

One of the main features of the plan, and that which will consume the greater part of the vast appropriation, is the extension of the railroad system of France. The rest of the money will mainly go to the construction of new harbors and the improvement of the old ones. Another great public work which is urgently demanded by several of the departments is a canal from Creil-sur-Oise to Beauvais, Amiens, and Albert, with two important branches. It is averred that this extensive canal would be of the greatest value to the north of France; and it would certainly be the most considerable of all navigable French waterways, and would have the effect of reducing by one half the present freight charges from English ports to Amiens, Paris, and beyond.

A scheme for the construction of a network of metropolitan railways in Paris was hardly perfected before M. de Freycinet stepped in and claimed the perfected lines as belonging to the category of lines of general interest. Their concession has therefore been transferred from the Municipal Council to the general government. The cost of their construction is estimated at nearly a million dollars a mile. The Minister of Public Works has also obtained the appointment of a supreme commission on the treatment and utilization of French rivers, composed in equal thirds of legislators, officials, and manufacturers or agriculturists. It will consider irrigation, motive power, inundation, water supply, sewage, and similar questions. Add to all this his vast project of harbor improvement, and we see that M. de Freycinet has laid out a scheme of public works for France which will occupy the Republic for many years to come, constituting a system of internal improvements of extraordinary magnitude, which, if it is successfully completed, will itself make the new Republic memorable for generations.

One of the most interesting features of the plan is the construction of what are known as light or narrow gauge railways, largely as feeders to the main lines, on the most extensive scale. A commission was appointed last January to examine into this class of railways, both at home and abroad, and report on its value and feasibility; and the result of their inquiries has determined M. de Freycinet to build the nar-

row gauge railways throughout all France. The English engineering journals find fault with the conclusions of this commission, but they are very interesting.

They recommend a reduction of the gauge to 1 meter (3 feet 3 3/8 inches), and in some instances even to 75 centimeters, 3/4 of a meter (2 feet 6 inches), whereas in England a 3 foot gauge is preferred. They advise the dispensing with fences except at especially dangerous points and near dwellings; that the stations should consist merely of a waiting room, ticket office, and station master's lodgings; that the cars should be of two classes, with possibly an upper story; that they should be without useless ornamentation; and that the rolling stock should be at a minimum—in fact, that everything should be arranged with a view to strict economy. Under these conditions they estimate the cost of the roads, per mile, at an average of about \$22,000. They put th



SEWING MACHINE MANUFACTURE.

average speed at from 9.3 to 12.4 miles an hour. The subject of narrow gauge railways is now one of the most interesting in the whole range of railway questions, and it is well worth careful thought and study. During the last few years they have been built more or less extensively here and abroad, and they are likely to come into still greater use, as being cheaper in construction and in working, especially in new countries.

RECENT MECHANICAL INVENTIONS.

An improved tenoning machine has been patented by Mr. George H. Gregory, of Cannon's Station, Conn. It consists in a revolving cutter stock, which is recessed and provided with cutter heads, which are adjustable both laterally and longitudinally. The machine is designed for cutting tenons of round and oval shape.

An improvement in steam boilers, patented by Mr. Stephen J. Gold, of Cornwall, Conn., has a series of water receiving pipes that extend through a portion of the fire chamber and

connect with the steam space. The object of the invention is to secure the maximum area of heating surface, together with the greatest compactness.

Messrs. B. J. Feldman and Theodore Schlag, of Franklin, Pa., have patented an improved fan for driving flies from the table. It consists of a novel arrangement of fans or feather holders, and mechanism for operating them.

An improved carriage step has recently been patented by Mr. Richard N. B. Kirkham, of Kansas, Ill. The step is arranged to fold up compactly, and is operated by a lever and a chain or cord.

Mr. William H. Stickle, of Terre Haute, Ind., has devised an improved vehicle spring which, it is said, overcomes the swaying side motion, the jostling, and bumping which are common to ordinary vehicles.

An improvement in pianoforte actions, recently patented by Mr. G. O. V. Roederer, of Indianola, Texas, is proof against atmospheric influences, all of the movable parts, as well as the supports, being made of sheet metal.

Mr. Theodore Bickerman, of Henry, Ill., has patented an improved windmill, in which the rim, spokes, and rods are made of gas pipe, securing both lightness and strength. The sails are made of sheet iron or wood.

An improved screw press, which may be operated by steam or horse power, has been patented by Mr. P. R. Campbell, of Hurricane, Miss. It consists of a combination of mechanism, by means of which a strong pressure is easily obtained.

Zenes McGinnis, of Petrolia, Pa., has devised an improved coupling for sucker rods of oil pumps, by means of which the rod may be coupled and uncoupled without ascending the walking beam.

An improved weighing scale, in which the weights are suspended so that when the material to be weighed is put into the scoop the weights are lifted one after the other until the desired weight is attained, has been patented by Mr. D. Hallock, of Coxsackie, N. Y.

An improved log roller for transferring logs from the log deck to the sawmill carriage has been patented by Mr. Esau Tarrant, of Muskegon, Mich. It consists of a bar having movable ratchet teeth for engaging the surface of the log and in novel mechanism for operating the toothed bar.

Mr. John R. Fish, of Grand Rapids, Mich., has patented an improved locomotive smokestack, which contains a novel arrangement of spark arresters, which offer little obstruction to the draught, but effectually prevent the escape of sparks.

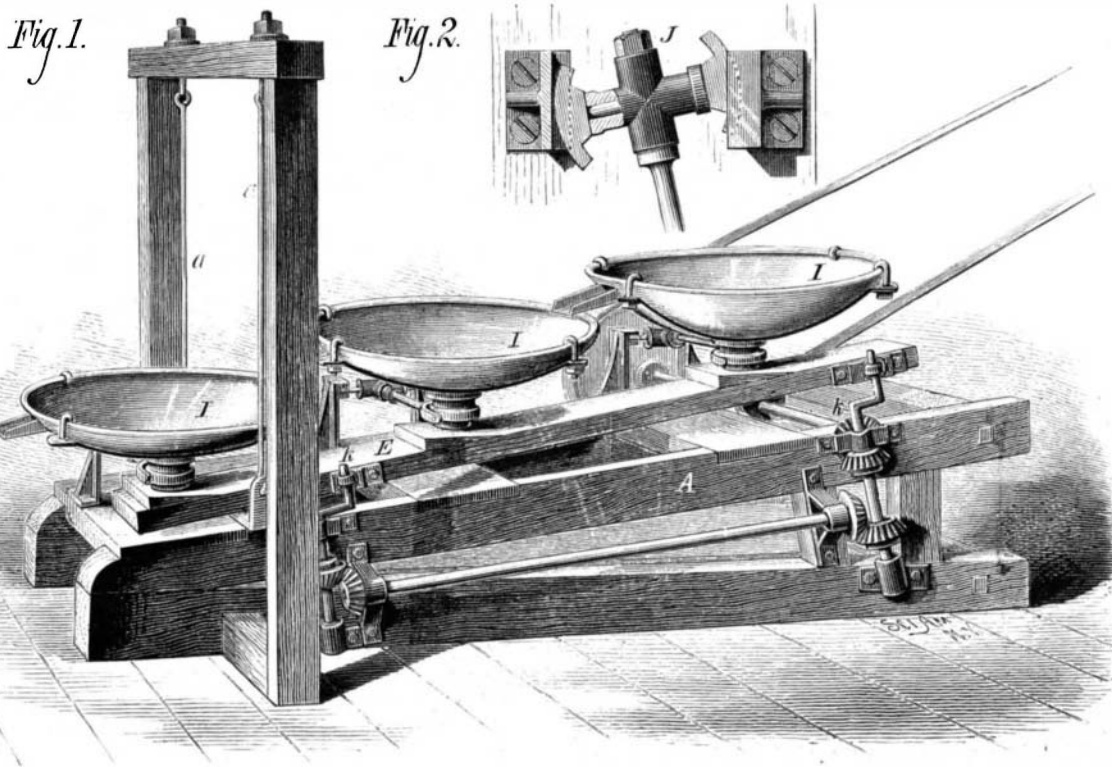
An improvement in rotary water meters, patented by Mr. Henry J. King, of Middletown, N. Y., is provided with a spiral screw for operating the registering mechanism. The screw is made in sections, and may be adjusted on its shaft, which is journaled in the water pipe.

AN IMPROVED AMALGAMATOR.

The accompanying engraving represents an amalgamator constructed on a novel principle, and having a peculiar arrangement of mechanism, by which an oscillating or vibratory motion is given to the amalgamated copper pans about their own axes while at the same time they are moved in a circular path and raised and lowered.

The pans, I, which are concave, are provided with internal rims or ledges, to prevent the swashing of the contents of the pan over its edges. Three or more pans are supported by short shafts journaled in the frame, E, which is suspended by the rods, a, from the standards of the frame, A, and oscillated by the cranks, k, whose shafts are connected by an inclined shaft and gear wheels so that they rotate together. The support of each pan is connected with the crosshead, J, by means of a short forked rod, which imparts to the pans an oscillating motion about their own axis as the supporting frame, E, is moved with a gyratory motion by the cranks, k, and is raised and lowered at its upper end by an eccentric on the upper horizontal shaft. Each pan is provided with a sheet iron spout, which discharges into the next below. The quicksilver readily unites with the copper to form an amalgam, which arrests the small particles of precious metal, and the escape of the quicksilver from the pans is prevented by the use of iron spouts, which do not become amalgamated.

This improvement was recently patented by Mr. Charles C. Peck, of Melrose, Mass.



PECK'S AMALGAMATOR.