

**Steel Rail Capacity of the United States.**

Name.	Capacity in Tons.
Springfield Iron Company.....	12,000
Indianapolis Rolling Mill Company.....	75,000
Joliet Steel Company.....	200,000
Lackawanna Coal and Iron Company.....	216,000
Troy Steel and Iron Company.....	120,000
Montour Iron and Steel Company.....	90,000
California Mills.....	50,000
Lochiel Iron and Steel Works.....	65,000
Cleveland Rolling Mill Company.....	200,000
Roane Iron Company.....	50,000
Union Steel Works, Chicago.....	168,000
Colorado Coal and Iron Company.....	125,000
Cambria Works.....	100,000
Western Steel Company.....	132,000
South Chicago Plant.....	250,000
Bay View Plant.....	50,000
North Chicago Plant.....	200,000
Carnegie, Phipps & Co.....	125,000
Union Iron Mills, Pittsburg.....	50,000
Edgar Thomson Plant.....	450,000
Cranston Steel Company.....	175,000
Pennsylvania Steel Company.....	300,000
Bethlehem Iron Company.....	250,000
Worcester Steel Works.....	50,000
Total apparent rail capacity.....	3,671,000

**PENBERTHY INJECTOR.**

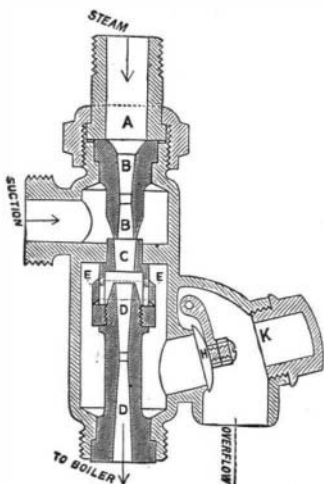
At last a mechanical combination and device has been produced, and a man's labor and study crowned with success, in the production, for the convenience of engineers, of a simple and compact device known as the Penberthy injector or boiler feeder.

Its mechanical construction is very simple, but perfect. All its parts are movable and convenient of access (not being screwed in), its working so complete that an inexperienced person can operate it with success and perfectness. Its adaptability to all classes of boilers, such as stationary, portable, traction, marine, and locomotive, and its working on each, makes it very desirable, and recommends it to all classes of engineers. The automatic working of this injector is of very great advantage, as by this mechanical construction it works under all conditions of shakes, jars, and concussions. In case of a break, or the suction is to be removed and then returned, it picks up or begins working without any aid, assistance, or attention from the engineer, thereby relieving of much care and annoyance. Its convenience of access is of very great consideration and importance, owing to the advantage of cleaning and examining its interior parts.

The working parts of this injector are stationary in their work, thereby causing comparatively no wear in its mechanical parts. The inventor seems to have combined common sense with mechanical science, by leaving out all complications, and combining in the injector every convenience of operating, getting at, and putting it on the boiler.

The body is of a single cylinder or barrel, with two jets inside, "steam and combining," and governed by an automatic swinging overflow. The injector is operated by the opening or closing of the globe valves. It is connected to the boiler and pipes with uniform and interchangeable square centered unions, and can be put on or taken off very quickly without any annoyance or injury, and the only tool required being an ordinary wrench.

Another great point gained in this injector is its great range of working capacity. It will lift water twenty-five feet perpendicular, or take it a hydraulic pressure and force it into the boiler at a temperature of from 140° to 180° Fah. It will work under a steam pressure of from 20 to 140 lb. It will also lift and force water



**PENBERTHY INJECTOR.**

at a very warm temperature (say 120° Fah.) in tank or well, and under all circumstances and at all points it works automatically. The inventor and manufacturers of the Penberthy injector have great confidence in its working qualities, and to satisfy engineers of its merits and perfectness of work, solicit a trial. From observation, a brilliant future is in store for this little wonder of simplicity and compactness, which is a model of mechanism in appearance and finish.

For prices, etc., address Jenkins Bros., 71 John St., New York, 13 So. 4th St., Philadelphia, and 105 Milk St., Boston, agents for this injector.

**PROTECTOR FOR LADIES' HATS.**

This simple and readily adjustable protector may be quickly applied to and removed from a hat or bonnet, without injuring its delicate trimmings, and may be adjusted to fit large or small hats. The main portion of the protector, which alone will be used to cover hats of small or medium size, consists of a piece of some light waterproof fabric strengthened about the margin with an inside facing. At the inner face of the body are secured a couple of narrow strips of suitable fabric (Fig. 2), forming casings for drawing strings. At the opposite edges of the facing are attached small rings, through either series of which a drawing string may be passed.

The extension piece (Fig. 1) of the protector consists of an endless band of waterproof fabric, like that of



**HOPKIRK'S PROTECTOR FOR LADIES' HATS.**

the body, provided at its edges with bindings, to which rings for drawing strings are secured. The protector can readily be adjusted and held upon a small or medium sized hat by properly manipulating the drawing strings. To adapt the protector to a large hat, the extension piece is united to the main piece by a string passed through the inner series of rings on the facing and through one of the series of rings on the extension piece. A string is then passed through the other rings of the extension piece, when the protector can be held to the hat by adjusting the drawing strings. It is evident that this protector may be applied over a hat without danger of crushing the most delicate trimmings.

This invention has been patented by Mrs. W. H. Hopkirk, of Agency, Iowa.

**IMPROVED STUMP PULLER.**

The stump puller shown in the accompanying engraving (page 130) is exceedingly powerful, as, by a system of compound levers, a pull of one pound on the operating bar will exert a pull of 384 pounds on the stump, and if the lifting chain be passed around a single pulley, this power is doubled. With one of these machines one man has pulled a green maple stump two feet in diameter from clay soil. The pulling mechanism is supported by a tripod, to the upper end of which is secured a chain carrying a bar or plate provided with a bearing in which slides a notched bar. Meshing with the notches of this bar are the teeth of a pawl, which is so connected, by levers, with the operating handle that the downward movement of the latter will raise the pawl and notched bar and the chain attached to its lower end. A sliding bolt then holds the notched bar in its raised position, when the handle can be raised to enable the pawl to engage with the next lower teeth of the bar. Thus, by a succession of up and down movements of the handle, the notched bar may be elevated its entire length, or until the stump is pulled completely out. It will be seen that the sliding bolt permits of the upward, but prevents the downward, movement of the notched bar when the pawl is disengaged and slides downward. But, by means of a suitably arranged hand lever, the pawl may be moved so as to be out of contact with the bar, and, at the same time, the bolt, which is pressed forward by a spring, may be moved to disengage it from the notch in the bar, which may then be adjusted in any desired position. The machine is built of steel and malleable iron.

This invention has been patented by Messrs. R. R. Tichenor and P. Walker, of Henning, Minn.

**The Defense of New York within Thirty Days' Time.**

The idea seems to prevail that the United States is absolutely helpless against a naval attack from England. I think this idea is entirely erroneous. There is the pneumatic gun, capable now of throwing 300 lb. of nitro-glycerine, which amount could easily be in-

creased to 1,000 lb. For the value of one modern iron-clad, 150 steamers with such a gun could be put in service in two weeks by the United States, because any steamer of 100 feet or over would answer; while the gun, being a mere tube, subjected to but 1,000 lb. of air per square inch, with air-compressing machinery, is all so available and quickly built that a month would put the United States into possession of 500 of them. If, now, 20 such steamers be told off for each iron-clad sent against us, even if two-thirds were sunk, they would, before being entirely demolished, succeed in depositing 5 to 10 tons of nitro-glycerine on the deck of the iron-clad, and exploding it.

Would not the effect of repeated explosions of 1,000 lb. of nitro-glycerine blow the deck in, dismount the guns and engine, and shake the armor loose, as the explosions of the Monitors' guns did when they were in service in the late war—the heads of bolts and other fastenings of the armor flying off from the concussion.

Then there is the submarine boat, that has already stayed under water thirty minutes with its crew, and been easily and correctly guided. What is in the way of using ten such boats to each iron-clad, one of which would unquestionably succeed in placing 1,000 lb. of nitro-glycerine under the iron-clad, the explosion of which would be heard from? Because the explosion of 90 lb. of gun-cotton did not materially damage an iron-clad, can it be reasoned that 1,000 lb. of nitro-glycerine, which would have twenty-five times the force of 90 lb. of gun-cotton, would be equally ineffective? Hardly, I think.

Nets, etc., would not prevent such boats from diving under them, while they would only impede the speed and maneuvering of the iron-clad, and render her more easily approached.

Blucher, the German cavalry officer, insisted that it was the impression and belief existing in Germany that Napoleon was invincible, and the Germans helpless, that alone prevented them from conquering. When the occasion came when he could demonstrate this, the Germans and allies easily defeated and dethroned Napoleon.

It is similarly true in this country, for too many believe that the English iron-clad is invincible, and this impression makes cowards of too many. Give the nitro-glycerine gun and submarine boat a trial, if occasion arises, and England's iron-clads will succumb as easily as Napoleon when sufficient power of the right kind was brought to bear on him. The right kind of power to apply to England is nitro-glycerine and dynamite, which could be ready with guns and boats in a month or less. One hundred days sufficed to build the first Monitor many years ago, and much less time will be needed for dynamite guns. WAYNE.

**Electroplating with Platinum.**

Platinum has not been much used in electroplating, notwithstanding its hard, durable, and protective properties. This is, perhaps, chiefly owing to the practical difficulty of obtaining a good firm "reguline" deposit. A process for effecting this has, however, been brought out recently by a Mr. Bright, whose patents have been acquired by the Bright Platinum Plating Company, and are in actual operation in London at works established there. Platinum has the advantage of keeping its color where silver, brass, or copper becomes discolored, and will, to some extent at least, replace the use of these metals in electrotyping. It will be highly useful in plating chemists' crucibles and so on. German silver, for example, plated with platinum can be used to manipulate strong acids. By the Bright process, platinum can be deposited on any surface which can be electroplated with other metals.

**COMBINED BRUSH AND COMB CLEANER.**

The invention herewith illustrated relates to a device for cleaning brushes and combs. It consists of a handle or body of suitable form, provided at one end with a brush, and at the opposite end with thin curved fingers of metal, or equivalent elastic material, adapted to enter between the teeth of the comb or the



**BROOKBANK'S COMBINED BRUSH AND COMB CLEANER.**

bristles of the brush. In making use of the device the hooks are employed to loosen and remove, as far as possible, the hairs or other foreign matter, after which the brush is employed to complete the operation. It is intended to afford a cheap, simple, and efficient means of cleaning articles in daily use in every household, and is virtually sure, considering the low cost at which it can be manufactured, to become a staple article of merchandise. The invention has been patented by Mr. J. O. Brookbank, of Driftwood, Cameron County, Pa., to whom all particulars relating to purchase of rights for the United States and Canada should be addressed.