

IMPROVEMENT IN STEAM BOILERS.

We give an engraving of an improvement in boilers lately patented by Mr. S. L. Hill, of 68 South Fourth St., Brooklyn, N. Y. In this boiler the inventor, by adding external water tubes, utilizes a great amount of heat that usually goes to waste, and thereby increases the capacity of the boiler without increasing the quantity of fuel consumed.

The boiler not only has this economical feature, but it is made safer and more durable by the addition of the water tubes. If the water contains any foreign matter likely to form sediment, it will be deposited in the horizontal pipe below the fire line.

Steam made in the tubes passes directly to the steam room of the boiler, and water is supplied to the water tubes by pipes leading from the water space of the boiler at each end. The curved tubes offer considerable protection to the fire sheets of the boiler, as they come between the fire and the boiler, and prevent the bottom of the boiler from being burned. This is especially advantageous where the feed water is very impure.

One of the principal advantages of this boiler is the facility with which it may be put together or taken apart. The ends of the water tubes are expanded into wrought iron flanges, to which cast iron reducers are secured by ordinary bolts, as shown in the sectional view. The joint is formed by two such reducers, connected by a double cone hollow plug, upon which the reducers are clamped by the coupling bolts. The peculiar form of the plug renders the joint similar to a ball and socket joint, and insures a tight joint, while allowing the pipes to expand and contract.

It will be noticed that none of the joints are exposed to the fire; they are consequently never corroded, and may be taken apart and put together whenever necessary without injury and without creating leaks. The great capacity of this boiler, its safety, and economy are points worthy of the notice of steam users.

IMPROVED SPINNING FRAME.

The accompanying engraving represents a perspective view of a new spinning frame—double sided—built by Philip Townson, of Thompsonville, Conn., and tested one entire week in the spinning department of the Hartford Carpet Company, in Thompsonville. The view is taken from the "geared end," and presents the most important acting portions of the machine.

The design of this improved spinning frame is to allow the use of softer twisted yarn than is now possible by the usual spinner; to reduce the amount of waste by breakage of the "ends;" to allow of either filling or warp to be twisted on the same machine; to equalize the strain on the yarn, whether the bobbin be small or large, or "thin" or "full;" and to increase the production of yarn from roving, not only by saving, but by speed.

The Townson spinning frame does not depend at all for the revolution of its bobbins on the tension and centrifugal speed of the yarn and the flier; but the flier has its own independent whirr and cylinder, and the bobbin spindle has also its own independent whirr and cylinder.—both plainly seen in the engraving, the two cylinders, one over the other, in the center of the frame, and the two series of whirrs shown on the face or front view.

As the bobbins fill up and increase their diameters, a cam, shown plainly in the engraving on the front, that makes one complete revolution in once filling—or for once doffing—changes

the feed gears, which are fixed on a rocking frame, disengaging a large or fast pinion, and engaging a smaller or slower pinion. This change is entirely automatic, and may be closely governed to suit differing sizes of bobbins, by changing the sizes of pinions on the oscillating frame, just as such changes are made on the ordinary drawing frame in the cotton factory to equalize and determine the weight of the yarn. In fact, this machine can be used in that way as a determinate measure of the size of the yarn.

The advantages of the new machine have been suggested by former items; but it may be stated that while a speed of feeding roller of 20 feet per minute is all that the ordinary spinning frame can deliver, this one delivers not less than 37 feet—a speed that may be extended to 45 feet. This increase

staves, 16 feet in length, bound together with heavy iron hoops. This tube is placed directly over the pits in a horizontal position, with an opening from each pit into the tube. At the end nearest the building there is a large drum containing a rotary fan propelled by machinery, the power of which is gas. That acts as a suction or draught for the smoke, which is conveyed into five stills filled with copper pipe, 2½ inches in diameter. The boxes in which the pipes are situated are 20 feet square, 8 feet deep, made of heavy pine, and filled with cold water; these are all connected by copper pipes; they are connected with the main still, 100 feet in length, 10 feet wide, 8 feet deep, filled with copper pipes, 2½ inches in diameter, in a horizontal position, surrounded with cold water; from this conveyed to a purifier, from which runs what is called pyroligneous acid, which is as clear as amber, with an unpleasant odor. From the acid is produced, first, acetate lime; second, alcohol; third, tar; the fourth part produces gas, which is consumed under the boilers. Each cord of wood contains 28,000 cubic feet of smoke; 2,800,000 feet of smoke handled every twenty-four hours, producing 12,000 pounds acetate of lime, 200 gallons alcohol, 25 pounds tar. These articles have a commercial value in the manufacturing of various articles. The alcohol has been contracted to a firm in Buffalo, N. Y., for five years, they furnishing the packages and receiving it at the works at 80 cents per gallon. The smoke from 40,000 cords of wood consumed per annum is thus made a source of much profit, as the works are nearly automatic.

A Cheap Railway.

There is now at work an interesting miniature railway—five miles in length—which unites the village of Westerstedde in East Frisia with the station of

Ocholt, on the Oldenburg and Seer line. It is solely due to the enterprise of the thinly-scattered population of the district, and carries their cattle and other produce to market, bringing them back their few requirements. The soil is marshy, so that a good deal of drainage work had to be done, and it was necessary to carry the line above the level of the frequent floods. In spite of this, the cost of construction was only £2,103 7s. 6d. per mile; and the cost of working (including wages, fuel, and every expense) amounts to the magnificent total of £1 7s. 6d. per diem. The buildings consist of a shed at each end of the line; the terminus is the courtyard of the principal inn at Westerstedde, and the single station—half way along the line—is the house of a gentleman, who hospitably entertains the passengers while they are waiting for the train. The rolling stock comprises two small four-wheeled

tank locomotives, weighing (when in working order) seven and a half tons each; three carriages of the American type, with a door at each end; two open goods trucks and two covered. A train consists of the engine and two vehicles, between which the guard sits. There are no turn-tables, so that the locomotive is at the hinder end of the train in returning. The fuel employed is turf, which is abundant in the district. The receipts of this tiny railway are steadily increasing.

The best time ever made on the western division of the New York Central was accomplished September 4, in a run from Syracuse to Buffalo, 150 miles, in 3 h. and 4 m. It was an express train, late from Albany. Between Syracuse and Buffalo stops were made twice for water, and once at Rochester for passengers.

Fig. 1.

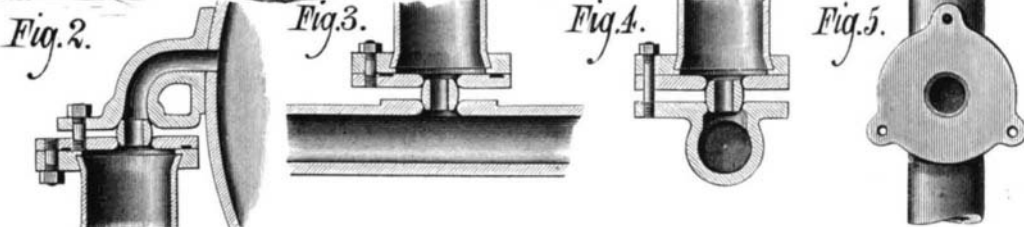


Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

**HILL'S IMPROVED BOILER.**

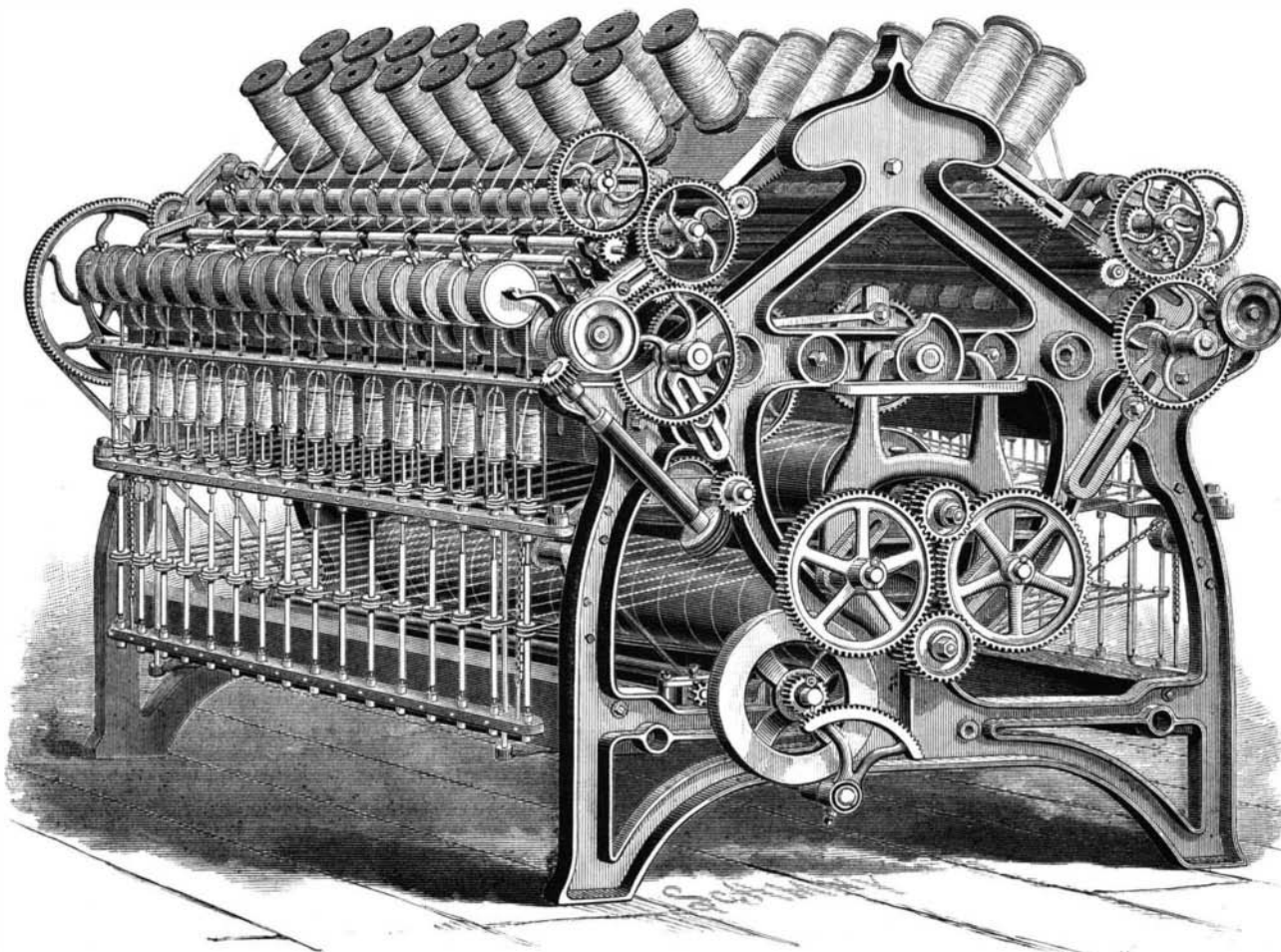
will double, and more, the capacity of this spinning frame. The machine is an evident improvement on anything now in use for producing either filling or warp yarn of woolen for carpet or other purposes.

The inventor is Philip Townson, of Thompsonville, Conn.

Utilization of Smoke.

At Elk Rapids, Mich., is a blast furnace, in which are manufactured 50 tons of charcoal iron per day. There are 25 charcoal pits, constructed of brick. Each pit is filled with 100 cords of hard wood and then fired. The vast amount of smoke from these pits, which was formerly lost in the air, has now been utilized by Dr. Pierce. Chemical works have been erected, which are thus described by the *Boston Courier*:

First, they have a circular tube made of wood, with pine

**TOWNSON'S NEW SPINNING FRAME.**