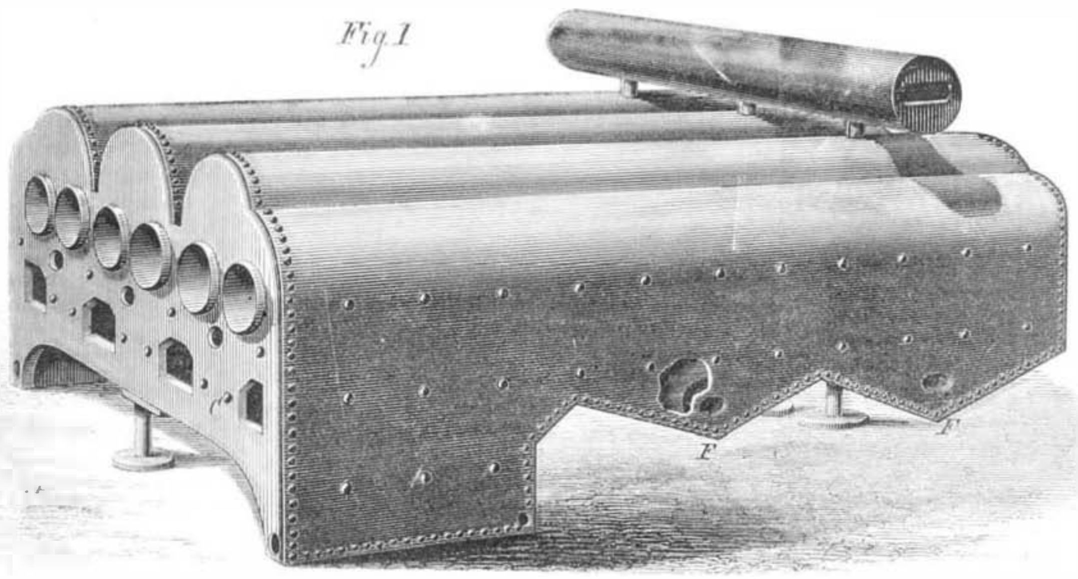
IMPROVED STEAM BOILER.

For marine use, and in localities where economy of weight as well as of space is of importance, the steam boiler represented in our illustrations will doubtless be found especially suitable. It can be put up without mason work, thus saving the cost of frequent repairing with fire brick, besides the handling and removing of much ponderous material in making other alterations or renewals; while, for the same reason, it is necessarily much lighter than the ordinary double flue generator. An equally important feature is the novel arrangement of a water jacket to form the sides of the fire box, back of the bridge wall and of the boiler, with which the mud drum is connected. In this arrangement the feed water is pumped into the jacket and not directly into the boiler so that, before it enters the main portion of the latter, it becomes heated to the boiling temperature, depositing its sediment in the inclined portion of the jacket, whence the impurities find their way readily to the mud drum. The feed water is thus rendered comparatively pure, scale prevented, and the generation of steam facilitated, while it is further claimed that a saving of fuel is effected of from 20 to 45 per cent, according to the size of the boiler.

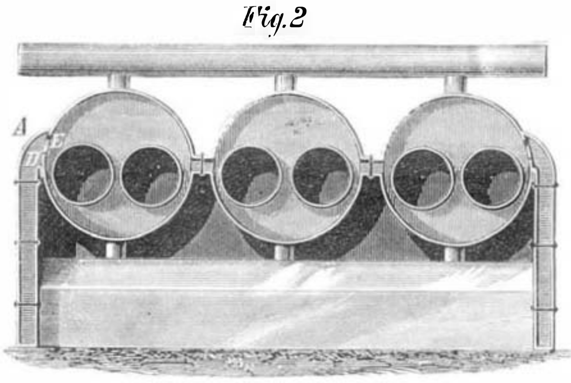
Fig. 1



HARVEY'S IMPROVED STEAM BOILER.

Fig. 1 represents a battery of three boilers; Fig. 2 is a transverse sectional view of the same; Fig. 3 shows the single boiler in perspective, and Fig. 4 is a longitudinal section. The peculiar feature of the construction is the water jacket, A, which forms the water legs, and then extends back to the other end of the boiler and across the extremity, as shown at B, Fig. 4. The plates of this jacket are connected by stays, C, and the inner plate is riveted to the boiler shell, at D, Fig. 2. The outer plate extends nearly to the top of the shell, and also connects with the frame by a steamtight joint. A series of holes, E, Figs. 2 and 4, establish communication between the jacket and steam space. The mud drum, F, Figs. 1, 3, and 4, is connected

Fig. 2



at the top with the shell, and its ends are riveted to the inner plate of the jacket. This is shown more clearly in Fig. 1. The bridge wall is also a water back, connecting with the water space of the boiler by the tube, G, Fig. 4. It will be observed, in Figs. 2 and 4, that the jacket extends down on each side from the inclined bridge wall to the end of the boiler, thus making the side of the fire flue to be steam generating surface, while the bottom of the jacket slopes both from front and rear toward the mud drum, so as to facilitate the deposit of sediment in the latter. In the battery, shown in Fig. 1, two mud drums are used, and the jacket bottom is made to incline toward both. It will be observed that the boiler is almost entirely enveloped in its water jacket, the stays and indeed all parts of which are easily accessible for repairs. The lower side of the fire flue is, besides, provided with a suitable covering, which may be readily removed for the like purpose, so that there is no portion of the generator that cannot be conveniently reached.

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Safety Device for Railway Cars.

A practical trial was lately made on the Eastern Railway, Mass., of the safety shoe patented March 8, 1872, by Emery and Doyden. The invention consists of a longitudinal plate of iron, placed under the car track, and suspended an inch or so above the rails. The car wheels pass through openings made in the plate. The latter has side flanges which project down below each side of the rail; and if the wheels leave the rail in either direction, the flanges catch on the rail and the car slides on the shoe, bringing the car quickly to rest. The utility of the invention appears to be fully demonstrated by practice, and its employment very greatly reduces the liability of damage by derailment of cars. The following were among the trial tests

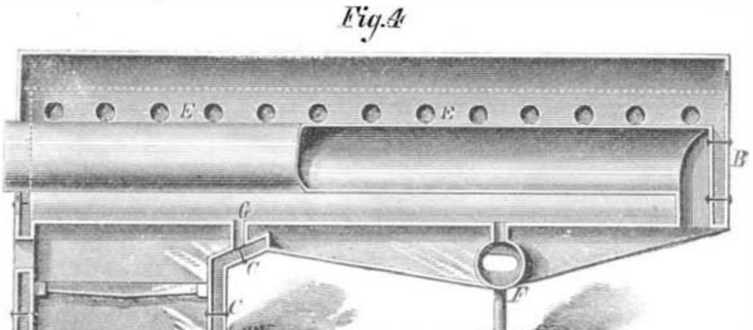
The first test was to open a switch, or set it wrong, as a misplaced switch would be, so that a train must inevitably run off the track. The engine then got up a speed of about twelve miles an hour; the car was detached before reaching the switch. The wheels ran off as soon as the switch was reached, but the shoe immediately caught the rails and the car slid along about three rods, and stopped. By means of a switch rope, the car was then got on the track by again leaving the switch open, the wheels striking the rails, the distance from the edge of the shoe to the center of the wheel being exactly that of the distance between two rails when a switch is opened.

The second test was at a greater rate of speed and was equally successful, the car sliding on the track by means of the shoes only a short distance further than before. The third time the engine went back a long distance from the switch and put on a speed of from thirty to forty miles an hour, and the car came at a fearful rate. The result was exactly the same, the shoes holding the car on the track and sliding a distance of about 300 feet before it stopped. The next test was to take out one rail entirely from the track. The car was then sent along the track at a speed of nearly twenty miles an hour. As soon as the open space left by taking up the rail was reached, the wheels were thrown from the opposite rail, but the shoe on that side caught and held the car on that rail until the open space was crossed, when the shoe on the other side also caught and the car stopped within three rods. The shoe can be applied to any trucks with but slight change, and at an expense for a passenger car of about $115, and of a freight car about $90. In addition to its being a preventive to trains running off the track, it acts as a brake, stopping a train as quickly as a Westinghouse brake or any steam brake.

Old Boots.

If any body imagines, because an American boot has, as an irreverent humorist expresses it, become "more holy than righteous," because the sole and the upper show an irresistible desire to part company, and because the heel is all on one side and the leather rusty and red, that such things are proofs that its term of usefulness to the human race is ended, then somebody is seriously mistaken. Let it be considered that a medium sized pair of boots packed closely together measure about 36 cubic inches, and that every person in this country casts aside at least one pair per year. The result would

Fig. 4



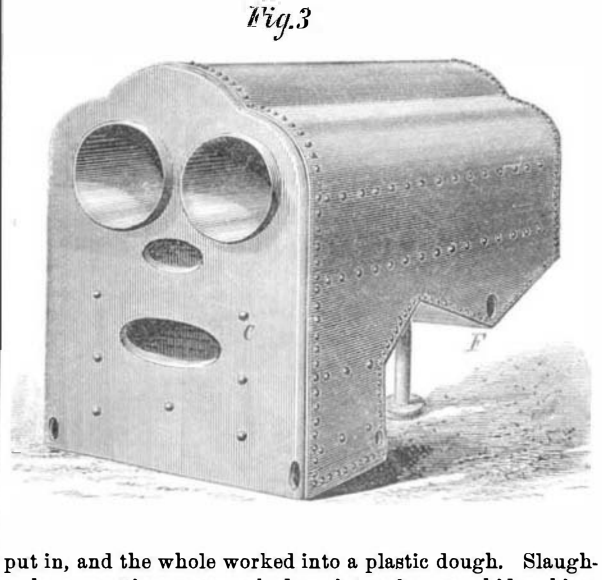
be a small mountain of shoe leather, 95 feet in every direction, an amount amply sufficient to arouse a very curious interest as to what becomes of it all.

A large percentage of the old boots undergo a second "wearing out" before their treatment as waste. The rag picker who may fish them out of the ash barrel, or the shoemaker on whose floor we may leave them when we purchase a new pair, will sell them to a second hand dealer for some trifling pittance. This last individual, if the uppers be not hopelessly gone, will carefully cut away the ragged edges, and remodel them for entrance into new shoes of smaller size; the legs he will remove from the feet, oil them, and attach them to a new sole and vamp, so that it would puzzle a philosopher to discover the remains of our former well worn coverings in the two pair of spruce-looking and apparently brand new boots and shoes, in the composition of which they play the largest part.

When these wear out, the old leather is too decrepit to be again rejuvenated in the ordinary way, so that finally it, together with the dilapidated soles and demoralized heels, is handed over to chemical treatment, which works marvels; for from the old scraps new leather, ready to enter once more the hands of the shoemaker, is evolved. This is "pancake leather," however, unfit for anything save insoling medium shoes. It is employed, however, by conscienceless Israelites in Chatham street, with unblushing audacity, for making outer soles, and its durability will probably withstand a half mile walk or thereabouts. "Dose vasn't shoes made to valk in," an aggrieved Hebrew is reported to have remarked to an irate customer, who threatened dire vengeance because the soles of his new purchase wore out before he had got around the block, "dose vas gavalry boots!" This delectable material is made by cutting the leather into small bits, mixing it with cement, and then squeezing the whole into a compact mass. A similar article is produced from Manilla rope, which is said to answer better for insole purposes.

There are quite a number of patented processes for the utilization of waste leather, which convert it into leather board, valuable for a variety of employments. One way consists in grinding the material to a meal-like powder, mixing it with gums and cements, and applying steam. The compound is then kneaded and rolled into sheets. Another plan is to mix old leather, hemp fiber, and sheepskin cuttings, and boil with soda ash. Sulphuric acid and coloring matter are subsequently added, and the substance, molded into sheets, forms a good quality of leather board. Oerting's process makes a good waterproof article, which is useful for making buckets and similar objects. It consists in dissolving rubber in benzine, to which a quantity of ammonia is afterward added. The leather in the form of pulp is next

Fig. 3



put in, and the whole worked into a plastic dough. Slaughterhouse cuttings are worked up into glue, raw hide whips, and small fancy articles in immense variety.

We had almost forgotten one valuable employment of old boots—the manufacture of jelly. The reader may stare, but Science smiles superior and asserts very emphatically that a toothsome delicacy can be made from a dilapidated foot covering. Some time ago, Dr. Vander Weyde, of this city, regaled some friends not merely with boot jelly, but with shirt coffee, and the repast was pronounced by all partakers excellent. The doctor tells us that he made the jelly by first cleaning the boot, and subsequently boiling it with soda, under a pressure of about two atmospheres. The tannic acid in the leather, combined with salt, made tannate of soda, and the gelatin rose to the top, whence it was removed and dried. From this last, with suitable flavoring material, the jelly was readily concocted. The shirt coffee, which we incidentally mentioned above, was sweetened with cuff and collar sugar, both coffee and sugar being produced in the same way. The linen (after, of course, washing) was treated with nitric acid, which, acting on the lignite contained in the fiber, produced glucose, or grape sugar. This, roasted, made an excellent imitation coffee, which an addition of unroasted glucose readily sweetened.

By way of conclusion, let us "nail" a paragraph which still crops out occasionally among "scientific items" in country journals, and has reference to the synthesis of leather in tea, affirming that the addition of milk to the infusion of the herb acts upon the tannin therein, to form the leather.

The only difficulty about this statement is that milk does not contain a particle of gelatin, and hence cannot possibly form leather with tannin; so the neat calculation of the number of pairs of shoes which every human being drinks yearly is like the owners of the subject of this article—without substantial foundation