TWO FORMS OF A NEW DISH-WASHING MACHINE.

In the accompanying illustrations we present two forms of a new dish-washing machine, so constructed that the dishes to be cleaned are held rigidly in place to avoid all danger of breakage. The machine is the

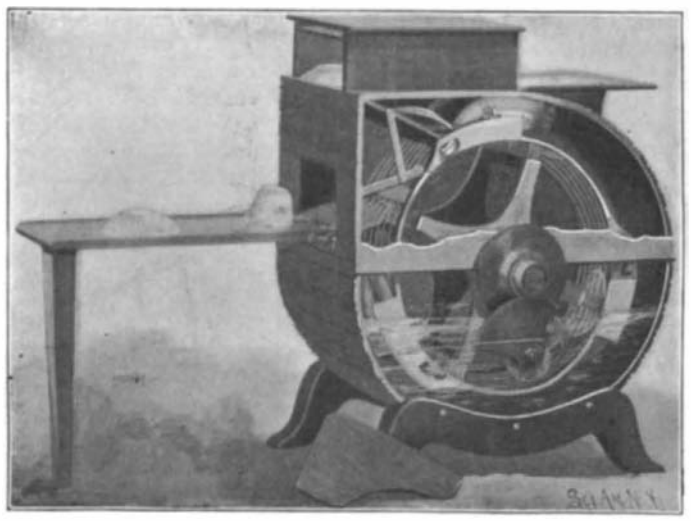


Fig. 1.—AN AUTOMATIC DISH-WASHER.

invention of Robert D. Parry and Edwin Evans, of Poultney, Vt.

The power-driven machine shown in Fig. 1, designed for hotels and restaurants, is composed of two parts, a water-reservoir and a cover hinged or hooked on the

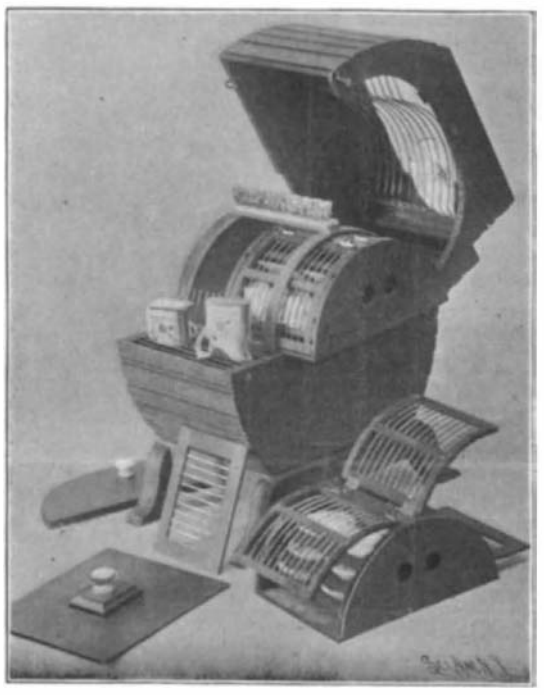


Fig. 2.—ANOTHER FORM OF DISH-WASHER.

reservoir. Within the water-reservoir two carrier-frames are mounted, the one rotating within the other. The outer carrier-frame is provided with spring-pressed clips shaped to receive and hold a dish firmly; the inner carrier-frame is provided with brushes, which pass over the inner surface of the dishes held in the clips, the outer surface being cleansed by brushes mounted in the reservoir. The two carrier-frames are so mounted and connected by gearing that the inner brush-carrying frame rotates at a speed many times that of the outer dish-carrying frame. In the cover of the machine two openings are formed—an upper feed opening and a lower discharge opening. As the dishes are placed in the feed-opening, the clips are automatically opened by spreaders mounted in the cover to receive the dishes; the dishes in rotating are thoroughly brushed and washed; as they reach the discharge opening another spreader opens the clips, thus releasing the dishes and enabling them to glide out upon the table. The water-reservoir can be heated in any desired manner. The inventors claim a speed of more than one dish per second for their power-driven machine.

The smaller hand-driven machine, shown in Fig. 2, designed for family use, differs from the first in some details of construction. A single carrier-frame is used, containing semi-cylindrical sections similar to that lying beside the machine in Fig. 2. Each section consists of two hinged outer members and a number of horizontal wire-work trays, upon which the dishes are placed. Brushes on the outer portion of the frame pass over the outer surface of any dish placed on the wirework rack fixed immediately over the carrier in the cover.

Both of the machines described are designed to wash dishes of all kinds, as well as knives, forks, and spoons. Public tests made by the inventors have demonstrated the utility of their device.

A WORLD'S RECORD IN BRIDGE BUILDING.

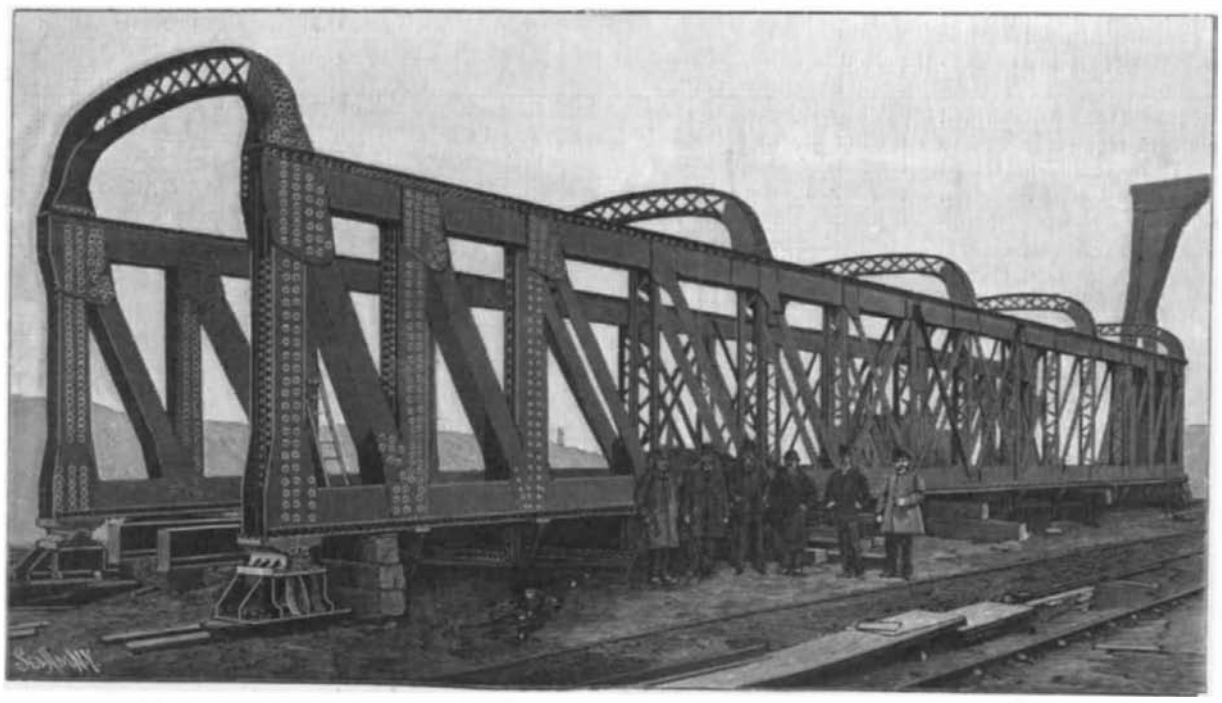
A feat in bridge building which, according to our English contemporaries, establishes a world's record for rapid construction, has lately been accomplished by the Patent Shaft and Axletree Company, of Wednesbury, England.

When General White committed the initial and, as events have proved, the most stupendous blunder of the present war, by assuming a defensive position in the town of Ladysmith instead of retiring from the hilly country to the south bank of the Tugela River, the Boers promptly availed themselves of the opportunity thus offered to isolate 10,000 of the British army, by rushing down to the Tugela River and blowing up the railroad bridge at that point, and also a smaller bridge at a place called Frere, a few miles nearer the sea coast.

The Natal government, immediately upon learning of the disaster, gave an order for the rebuilding of both these bridges; and they took advantage of the opportunity thus offered of building a much stronger superstructure to meet the increase in the weight of locomotives and trains, which had taken place since the bridge was first erected in the year 1877. The crossing over the Tugela at Colenso consists of five spans of 105 feet each, while that at Frere consists of two spans of the same length. It so happened that drawings for a more substantial bridge were in existence, and the Natal government was enabled to call for bids for their immediate construction.

Tenders were invited both in England and America, with the result that the contract was given to the Patent Shaft and Axletree Company, who undertook to deliver the first span in six weeks from the date of the contract. The order was given on the 21st of December, and the first span was finished on the 13th of January. After deducting the various holidays of the season and the three intervening Sundays, it is seen that the whole span was completed in nineteen working days. To appreciate the celerity with which the work was done it should be mentioned that when the order was received, nothing was in stock at the company's works except the ingots from which the structural material was rolled. According to The Engineer, to which we are indebted for our illustration, the company received the order at 9 o'clock A. M. on the 21st, and by 5 o'clock P. M. on the same day one hundred tons of the material had been rolled at the company's works, and tested and approved by the engineer of the Natal government.

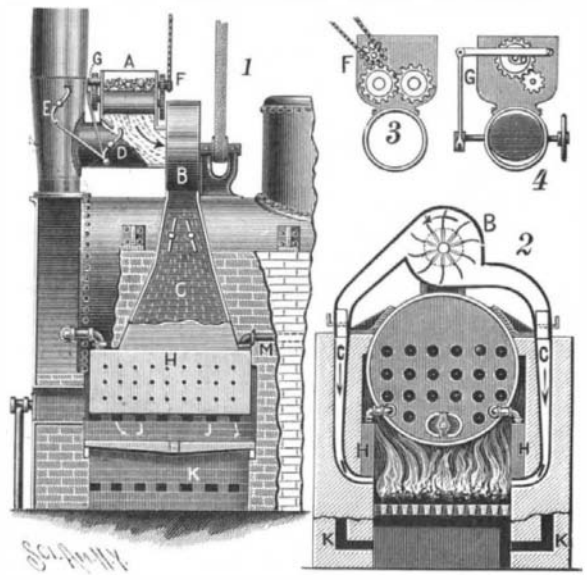
It will be seen that the bridge is of what is known as the "through" type, with riveted connections throughout. The trusses are shallower than would be used in this country, so shallow indeed that triangulated lateral bracing of the usual type cannot be used, the lateral stiffening of the upper chords being done by means of five arched members which extend across the bridge at every third or fourth panel-point. The bridge is 16 feet wide in the clear, and as the railroad it accommodates is of only 3 feet 6 inches gage, there is a space for pedestrians or horse traffic on either side. Each of the spans weighs 105 tons, or a ton to the foot lineal of the bridge. In view of the fact that the edge of the plates of which the bridge is built are all planed, involving about 7,500 feet lineal of planing, and that there are 69,000 rivet holes to be drilled in each span, it must be admitted that every credit is due the firm for such rapid work. On January 19 two of the spans had been built and work had been begun on the third, fourth and fifth spans, while the material for the whole seven had been rolled, cut to size, tested and approved.



FIRST SPAN OF NEW BRIDGE ACROSS THE TUGELA, NATAL—BUILT IN NINETEEN DAYS.

A MECHANICAL STOKER FOR FURNACES.

A patent has been granted to Robert M. Campbell and Albert H. Schofield, of Port Huron, Mich., for a novel device by which crushed fuel is fed to a boiler furnace and heated by the hot gases passing from the furnace. Fig. 1 is a longitudinal sectional elevation of a boiler, showing the device applied. Fig. 2 is a transverse section through the feeding chute. Figs. 3 and 4 are details. At the sides of the furnace beneath the boiler.



AUTOMATIC FEEDING SYSTEM FOR BOILER FURNACES.

water-legs, *H*, are located through which the feed-water passes on its way to the boiler. The grate is located beneath the water-legs and beneath the lower ends of the chutes, *C*, through which the fuel is introduced. Fresh air is supplied to the furnace by the flues, *K*, the air being heated before it reaches the burning fuel. The gases after having traversed the boiler enter the smoke-stack, which is provided with an adjustable damper, *E*. Fuel is supplied to a hopper, *A*, provided with crushing rollers in its lower portion. The rollers, as shown in Fig. 3, are driven by a chain, connected with gear-wheels, *F*, on the roller shafts. The rollers and hopper are placed immediately above a pipe connected with the smoke-stack and provided with a damper, *D*, by which the gases are prevented from passing into the pipe from the smoke-stack. The dampers, *D* and *E*, are connected and automatically opened and closed alternately by the mechanism shown in Fig. 4, consisting of gear-wheels operating a lever and a link, *G*, by means of a crank-pin. When the damper, *D*, is closed, the damper, *E*, is open. At the end of the pipe containing the damper, *D*, a casing, *B* (Fig. 2) is placed containing a fan, rotated by a belt and pulley. This fan discharges the crushed fuel into the chutes, *C*, and thence into the furnace. The chutes, it will be observed, are widened as they reach the grate to a width equal to the length of the furnace. The chutes, *C*, can be provided with dampers. To distribute the fuel crushed by the hopper-rollers, the chutes, *C*, are provided with adjustable deflectors. This mechanism periodically draws hot gases from the chutes, leads these gases away from the boiler, and discharges them back into the furnace, carrying with them the finely divided fuel, which is therefore heated before entering the furnace. When the damper, *D*, is closed, the gases pass directly up the stack, and no fuel is fed, since there is no draft through the pipe containing the damper, *D*. This condition lasts but a short time. By this automatic feeding system, the gases are completely burned and the maximum caloric efficiency of the fuel secured; the fuel, being finely crushed before entering the furnace, is quickly consumed.