A LOCOMOTIVE IN SERVICE SIXTY YEARS.

BY HERBERT T. WALKER.

In the earlier days of railroads, the life of a locomotive engine was longer than it is now, for even within the last decade many engines built under the personal supervision of Stephenson, Bury, Baldwin, and Rogers were in active service on the railroads of the United States and Great Britain, as well as on those of other countries that depended on us and the British locomotive builders for their supply of railway motive power.

During say the first forty years of railroad history, the engines were not, as a rule, worked to their fullest capacity; but as time went on, the requirements of railroad work became more exacting, and the period during which an engine was in the roundhouse grew gradually shorter, until to-day a locomotive, especially if it is in freight service, is almost constantly at work, the only intervals being the time necessary for oiling, inspection, and repairs.

As a consequence of these present conditions, one seldom sees a really old locomotive in service; but a notable exception is illustrated in the accompanying engraving, showing an engine which has been in constant use for nearly sixty years on a branch railroad in Santiago de Cuba.

This locomotive was built by M. W. Baldwin, and, by the courtesy of Messrs. Burnham, Williams & Co., who have, at the writer's request, referred to their old records, we are able to publish some interesting details of a design of engine originated by one of the most celebrated of the pioneer locomotive builders of the United States.

It appears that in the years 1847 and 1848 two locomotives of the type illustrated were built for the Havana & Guines Railroad, and one of them is doubtless the engine forming the subject of this notice. The cylinders were inside-connected and were 14½ inches diameter by 18 inches stroke. The engines weighed somewhere about 18 tons.

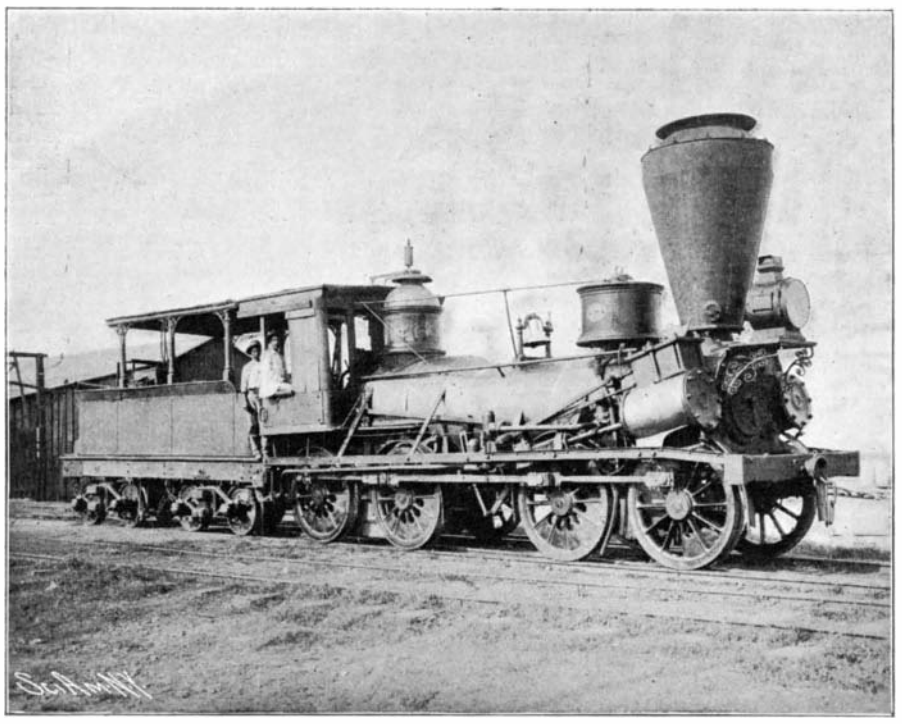
The leading feature of this design is in the wheel arrangement. All the wheels are drivers, and from the engraving it would appear that the engine is without a truck; but in reality the four front wheels have inside journals running in boxes held by two deep wrought-iron beams, one on each side. These beams are unconnected and entirely independent of each other, and their pedestals are bored out cylindrically to receive cylindrical journal boxes. The main engine frame on each side is directly over each beam, and a spherical pin, running down from the frame, bears in a socket in the beam midway between the two axles. Each beam can thus independently turn, horizontally or vertically, under the spherical pin, and the cylindrical boxes can also turn in the pedestals, so that in passing over a curve, the front pair of wheels can move laterally in one direction—say to the right—while the next pair moves in the opposite direction, or to the left, the two axles always remaining parallel to each other and to the two rear axles, which latter are mounted rigidly in the main frames, as in ordinary locomotives.

The operation of these beams is therefore like that of a parallel ruler, and the spherical pins allowing them to move in a vertical as well as a horizontal plane, they act as equalizers, and so permit the four wheels to accommodate themselves to a rough, uneven track.

It should be explained that the coupling rods are made with ball and socket joints, to enable them to conform to the lateral movements of the wheels. This invention of Baldwin's was known as the "flexible beam truck," for which he secured a patent August 25, 1842; it solved the problem of producing a locomotive with a flexible wheel base, in which the total weight of the engine was available for adhesive purposes.

Other details of this engine may also be noted. It will be observed that the valve chest has two valve stems. The explanation of this is that the chest has two compartments, with a separate slide valve in each chamber. One valve cuts the steam off at full stroke, and the other at an intermediate portion thereof. By suitable levers these valves can be worked either separately or together. This device was one of many invented by Baldwin to take the place of the Stephenson link motion, which he did not consider to be a satisfactory valve gear.

The large smokestack indicates that this locomotive is a wood burner, which fuel requires special provision for preventing an excessive discharge of sparks from the chimney when the engine is under way. Even with the most approved stacks, wood-burning engines throw much fire, and many of us can recall an early day, when we watched the night express as it speeded by, sending showers of bright sparks flying over the dark landscape.



ONE OF THE OLDEST LOCOMOTIVES IN USE.

It has been running on a Cuban branch railroad out of Santiago for over sixty years.

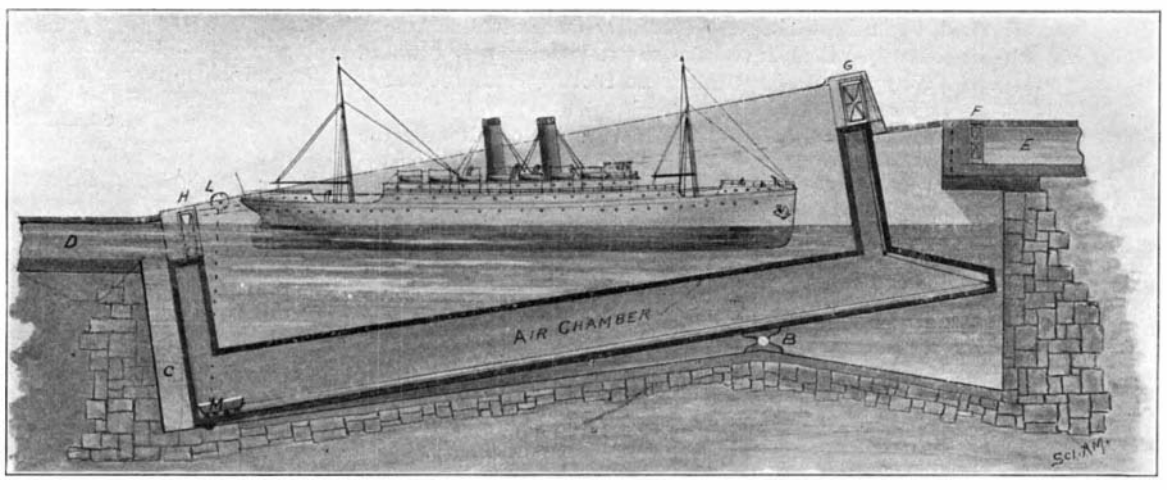
A TILTING LOCK-CHAMBER.

A peculiar form of canal-lock, indeed perhaps more peculiar than serviceable, has been invented by Charles A. Cardot, of Paris, who hopes by means of this device to raise or lower a ship of any size from the upper level to the lower, or *vice versa*, without losing a drop of water.

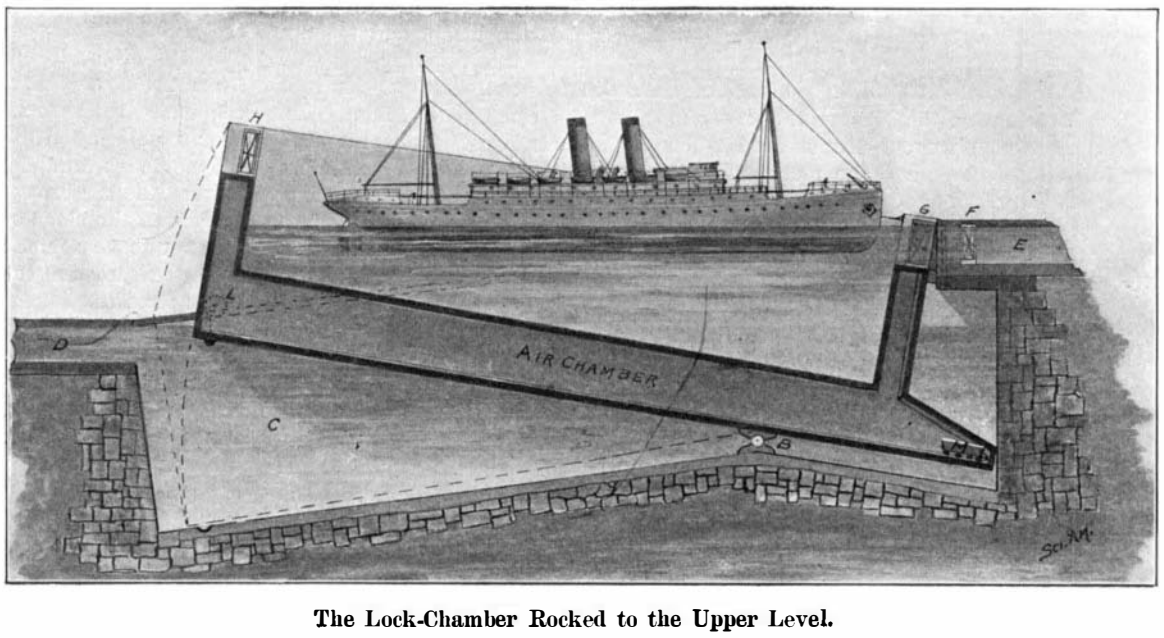
The invention, as the two accompanying illustrations clearly show, comprises essentially a lock-chamber, *C*, permanently in communication with the water, *D*, of the lower level. It will be observed that the bottom of this chamber is formed with two inclines of unequal length, so that the highest point will lie nearer the upper level, *E*, to permit the raising and lowering of the vessel. At this highest point a ridge, as it were, is formed, which constitutes the fulcrum for a floating-chamber mounted to rock on the shaft, *B*.

This floating-chamber is constructed with double walls, constituting an air-chamber, and comprises in itself a water-compartment, the ends of which are closed by gates *G* and *H*. At the bottom of the air-chamber a track is laid, on which a weight, *M*, is mounted to travel. The weight, *M*, is connected, by means of a cable passing over a pulley, with a float, *L*.

In order to tilt the floating chamber down to the lower level, the weight, *M*, is caused to travel in the direction of the lower level, whereupon the corresponding end of the floating chamber descends. When the lower level has been reached, the gates, *H*, are opened, and the vessel continues on its journey. In order to raise a vessel from the lower to the upper level, it is obvious that the reverse operation must be gone through.



The Lock-Chamber Tilted Down to the Lower Level.



The Lock-Chamber Rocked to the Upper Level.

A TILTING LOCK-CHAMBER.

New Bread-Making Process.

United States Consul Mahin, at Nottingham, England, says in a recent report:

"A journalist, Mr. W. Pickering, whose address is not given, though it is presumably London, is credited in a current newspaper item with an invention which entirely dispenses with the customary night work in bread making. The preparation of the dough takes most of the time required in the ordinary baking process, as, after mixing and kneading, it must be left to rise, which requires from four to twelve hours. Mr. Pickering's invention reduces this time to about one hour. No additional plant is required and no extra ingredient is put into the bread. 'The effect is produced by the action of temperatures,' explains the descriptive article.

"At a practical demonstration recently given, it is said that the flour was made up into dough ready for the oven in fifty-nine minutes, and the batch of twenty-five loaves was produced from the raw flour in two hours and thirty-five minutes. The flour was weighed and the number of loaves compared with the number produced by the ordinary process, and it was found that eight more quartern loaves than usual are produced from a sack of flour."

Cement production in the United States in 1903 amounted to 28,454,140 barrels, according to the United States Geological Survey. Of this amount 20,897,973 barrels were Portland cement, 7,030,271 barrels were natural cement, and 525,896 barrels were slag cement. The amount made in 1903 was about 2,700,000 barrels more than in 1902, the output in the preceding year.