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## A NEW STEAM FIRE ENGINE.

In reciprocating piston steam fire engines of the ordinary construction, the common method of converting the reciprocating motion of the piston into a continuous rotary motion is to employ a slotted crosshead in which the crank pin revolves. This method is open to the serious objection of undue wear and a useless absorption of power. In the engine shown in the engraving, these objections are, in a great measure, if not wholly, overcome.

This engine, as will be seen from the engraving, somewhat resembles others now in use, but it differs from them especially in one particular, that is, in the manner of imparting motion to the flywheel shaft. The steam cylinder is placed directly over the water cylinder or pump, and their pistons are attached to opposite ends of a common piston rod, to the center of which, between the two cylinders, is attached a short crosshead, whose ends carry short connecting rods or links, which are pivoted to the end of a lever, or half walking beam, in the end of which there is a guide-hole through which the piston rod passes. This lever is pivoted at the other end to the frame of the engine, and between the piston rod and the middle of the lever is pivoted the main connecting rod, B, the lower end of which connects with this crank on the main or flywheel shaft.

By this construction a uniform and easy motion is secured, and much of the friction common to other forms is avoided.

This engine, which is known as the Moorlen Steam Fire Engine, was recently patented, through the Scientific American Patent Agency, by Messrs. Hiram H. Hill and Frank

Moorlen, of Augusta, Me., from whom further information may be obtained.

## "FORNEY" LOCOMOTIVE FOR THE NEW YORK ELEVATED RAILROAD.

The larger of our title page engravings represents one of the eight-wheeled locomotives which are now at work on the east side or Third avenue line. This type of engine,

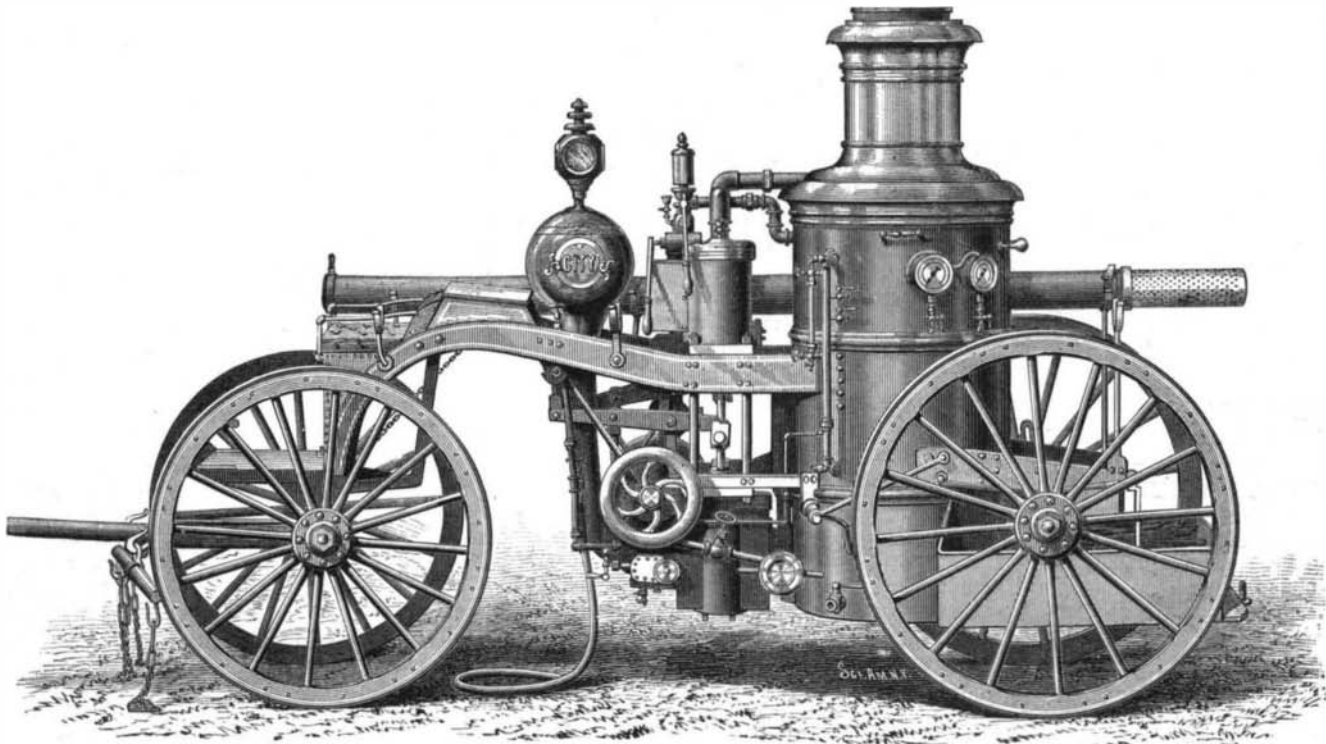
out turning around, and run over curves of 100 feet radius. The service is very severe, as the stations are only about a quarter of a mile apart, and therefore, to put the case in a Hibernian way, the running consists chiefly of stopping and starting.

The principal dimensions of the engines are as follows: Cylinders, 10 by 14 inches; driving wheels, 38 inches diameter; distance between centers of driving wheels, 5 feet 6 inches; total wheel base, 15 feet; length of fire box, 42 inches; width of fire box, 34 inches; inside diameter of boiler at smoke box, 34 inches, 105 tubes, 1½ inches diameter, 5 feet 10 inches long; height of chimney above rail, 10 feet 10½ inches; capacity of tank, 475 gallons; size of steam ports ¾ by 9 inches; size of exhaust ports, 1½ by 9 inches; lap of valve, ⅝ inch; maximum travel of valve, 8¾ inches; total weight of engine with full supply of water and fuel, 29,890 lbs.; weight on driving wheels, 19,170 lbs.; weight of engine without water or fuel, 23,380 lbs.

The engraving is made from a photograph of one of the

engines built by the Baldwin Locomotive Works, of Philadelphia, but a portion of those now in use on the New York Elevated Railroad were built by the Rhode Island Locomotive Works, of Providence, from the same drawings.

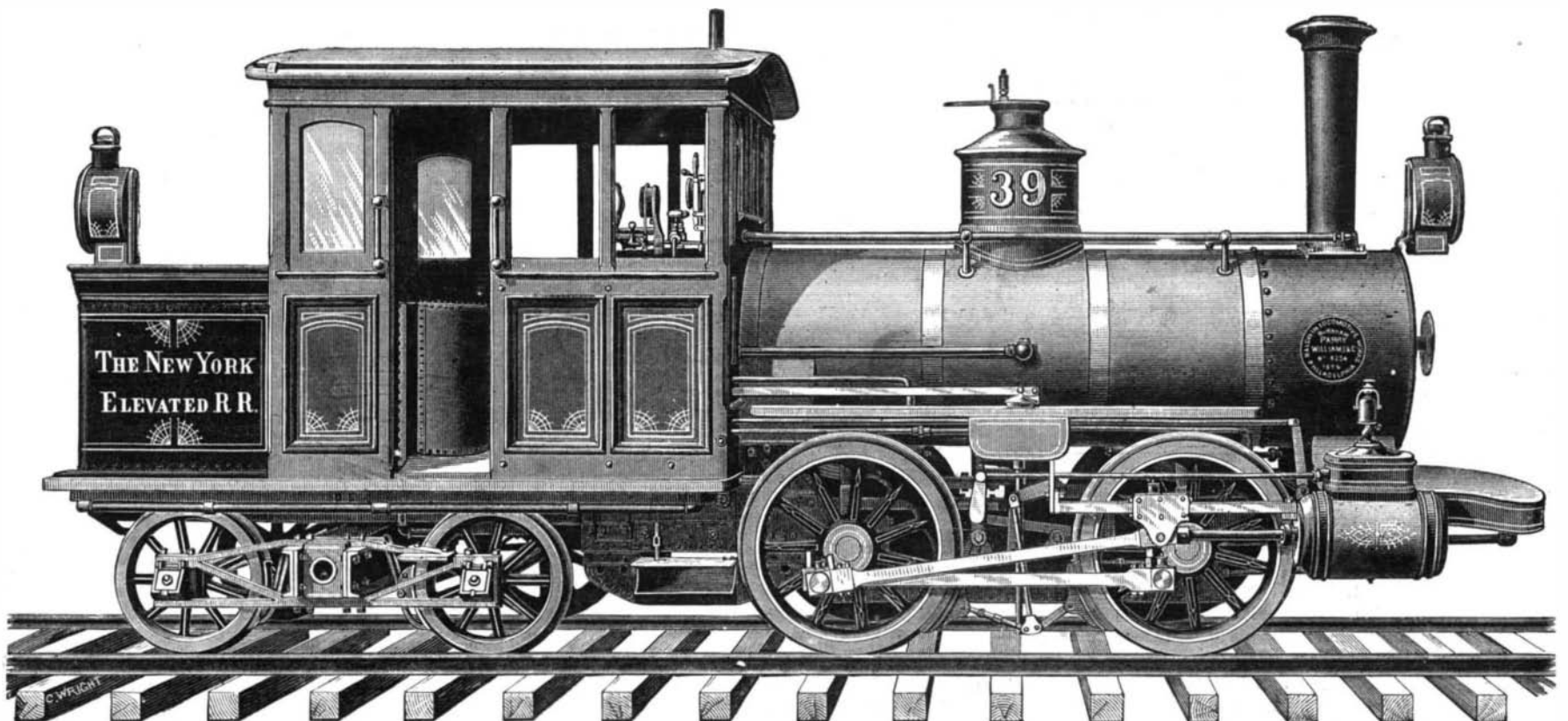
ACCORDING to the *Pharmaceut. Centralhalle*, a serious accident in a factory led one of the owners to experiment as to the cheapest and best substances for making garments incombustible. He found that a 5 per cent solution of ammonium phosphate accomplished this purpose.



THE MOORLEN STEAM FIRE ENGINE.

which is known as the "Forney" locomotive, is now for the first time brought into extensive use, although several of them have been built and have worked satisfactorily.

The directors of the New York Elevated Railroad, after giving two orders, each equally divided between the four-wheeled and the eight-wheeled engines, have given a third order for twenty-five of the eight-wheeled, which may be interpreted as a decision in favor of the Forney locomotive. Thus far these locomotives have worked very successfully, as any one may see. The engines are run both ways, wit-



"FORNEY" LOCOMOTIVE FOR THE NEW YORK ELEVATED RAILROAD.