

AUTOMATIC COUPLER TESTS.*

The committee of the Master Car Builders' Association decided, as its work for 1894, to make three series of tests, approximating as nearly as possible the conditions of service:

1. A drop test of couplers resting on a draught spring, a slight allowance of lateral play being given the shank. This test, by transmitting the blow to the solid foundation through the draught spring and through the horn, represents, as nearly as can be, the service required of couplers in resisting concussion.

2. Guard arm tests with couplers supported as above, to determine the relative strength of the guard arm and the shank immediately back of the head. This test was considered most important, on account of the very large percentage of failures at these points.

3. Jerk tests representing the strains which couplers are called upon to resist in starting heavy trains, or when trains pass over points of change in grades. The committee, before deciding upon this last test, gave the subject full consideration, and was led to the method adopted to reproduce service shocks as nearly as possible on a machine. It was thought by it that couplers tested in this way might give different results from those tested under the steady pull of a tensile machine, and it was further believed that if this system of tests gave results of value, it would enable the whole series of coupler tests to be made on one machine.

In order to carry out these tests, the committee was obliged to redesign and build a new drop test machine. Profiting by the experience of the previous year, the machine was made very much heavier and stronger, and is fully shown in the illustrations.

The specifications under which the tests were made provided in part as follows:

STRIKING TEST.

Two couplers taken at random shall be used for this test. The draw-bar shall rest on a standard freight draught spring and to be held in position as arranged for in the construction of the machine, so that the horn will stand off 1 3/4 inches from the striking plate. Draw-bars shall receive blows on the knuckle from a weight of 1,640 pounds dropped three times from a height of five feet, and three times from a height of ten feet, blows to be continued from a height of fifteen feet until couplers are unserviceable.

GUARD ARM TEST.

One coupler shall be used for this test. It shall be held as described in the striking test, but in a position to bring the guard arm below the drop. Draw-bars

in this test shall receive three blows from a weight of 1,640 pounds dropped from a height of three feet, striking squarely on the point of the guard arm, blows to be continued from a height of five feet until guard arms or draw-bars are fractured.

JERK TEST.

Two draw-bars shall be used for this test and shall be inverted and placed in the machine together, suspended from pedestal by tail bolts and yokes and

in the striking tests show 16 per cent of the shanks cracked and broken behind the head; 26 per cent cracked and broken in the head; and 44 per cent of knuckles broken.

In the jerk tests the equalizing bar was so shaped at the ends as to bring direct pull upon the knuckles of the pair of couplers under test, with the least possible spreading action. The results of the test show 9.5 per cent of the couplers broke in the heads and 26 per cent of the knuckles broken; the remaining couplers were thrown out on account of distortion beyond the limits of the test by the combined failure of pivot pins, knuckles and locks.

The result of the striking and jerk tests, considered together, show that out of ninety-two couplers 22.8 per cent of the knuckles were broken or cracked and 30.4 per cent of the couplers broken, either in head or shank; but the breakage in knuckles would probably have been greater had not many of them been thrown out on account of being beyond the limit, before they were broken—52 per cent of the couplers failing on this account; which goes to show that the pivot pins are generally weak, allowing knuckles to close before any other damage has been done. It will be observed that coupler lug failures are exceedingly few.

Of knuckle failures, 70 per cent are in tongue, 14 per cent in one or both of the lugs, and the same percentage in pinhole.

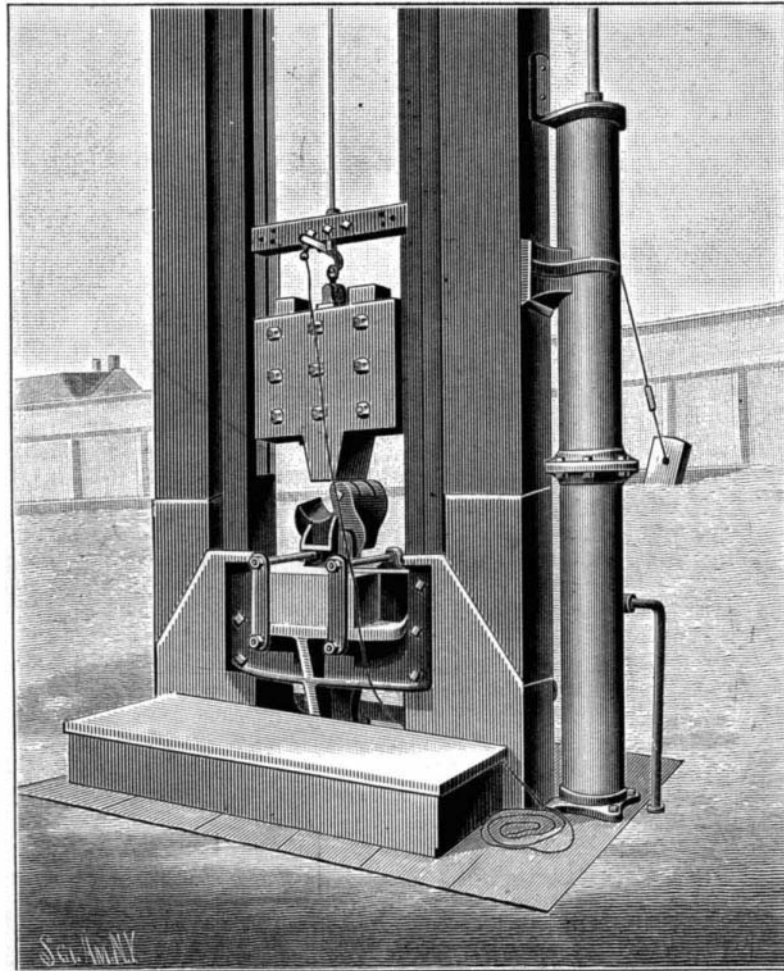
The guard arm test may be criticised as artificial and arbitrary. Service has shown, however, that a very large percentage of coupler failures is due to guard arm breakages, the result, no doubt, of blows from ordinary link and pin couplers glancing from closed knuckles or striking directly upon the guard arms.

The results of the test are, 68 per cent broken shanks, 27 per cent broken guard arms, and 18 per cent broken locks, some couplers combining two or more failures.

The result of this test conflicts with the observation of service, for whereas in actual service there is a preponderance of guard arm failures, in the test the shank failures are in excess. The probable explanation is that direct blows concentrate the shock on the opposite side of shank, whereas a glancing blow or one from a broken link and pin coupler wedges off and breaks the guard arm alone.

Simon Ingersoll.

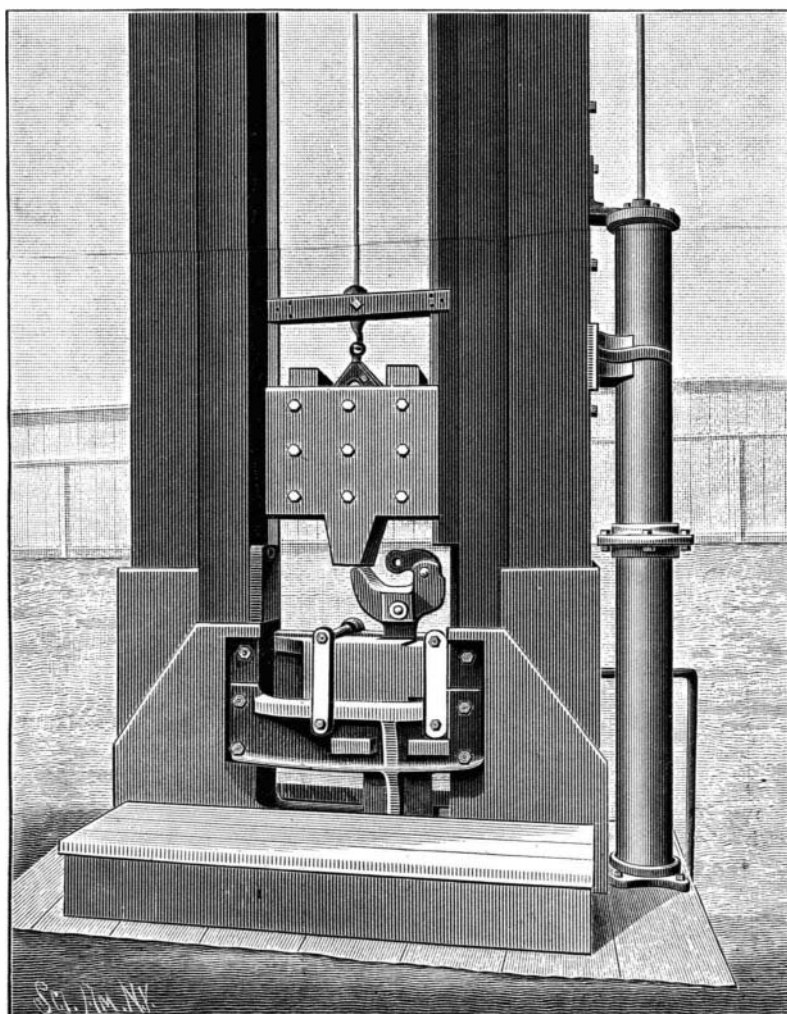
Simon Ingersoll, the inventor of the Ingersoll rock drill, died at his home in Glenbrook, Conn., on July 24, at the age of 76. He had lived in retirement for some years, and was a plain and unassuming man. He died poor, although others made fortunes, by their efforts and business skill, out of his inventions.



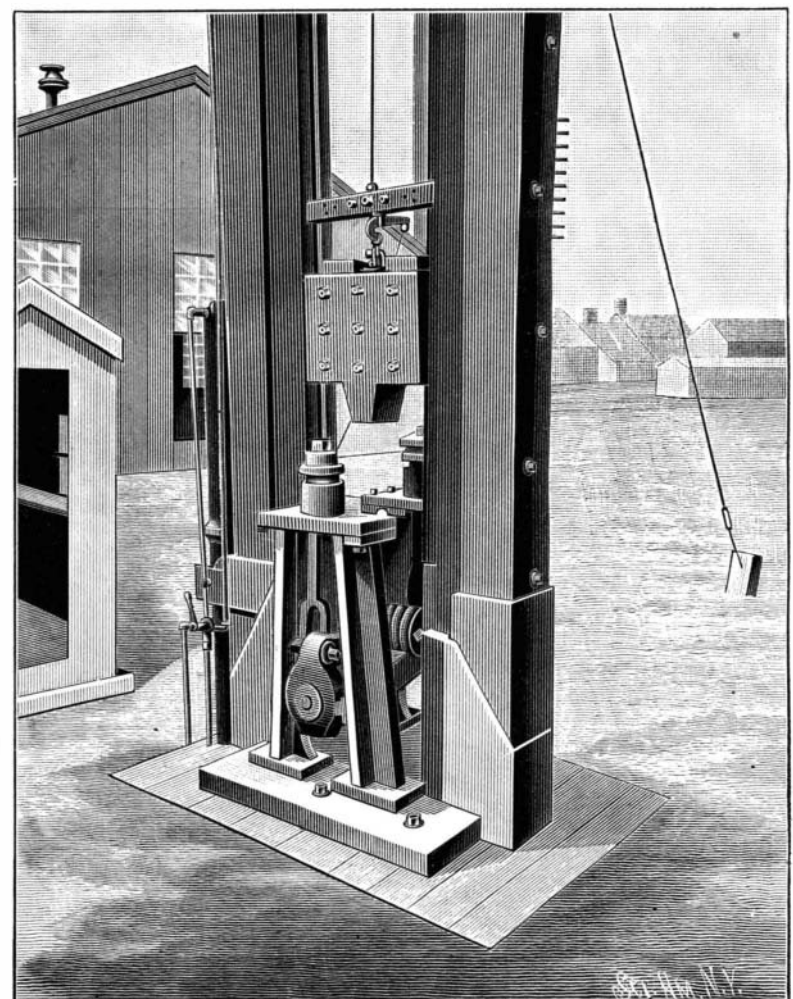
CAR COUPLER STRIKING TEST.

freight draught springs, allowing 1 3/4 inches between striking plates, and held in position as arranged for in the construction of the machine. A weight of 1,640 pounds to be dropped on an equalizer bar connecting the two couplers, three blows from a height of five feet and three blows from a height of ten feet; blows to be continued from a height of fifteen feet until coupler is destroyed or unserviceable.

Twenty-one complete sets and four incomplete sets were tested, and of this number fourteen were made of malleable iron and eleven of steel, all couplers being equipped with steel knuckles. The results obtained



CAR COUPLER GUARD ARM TEST.



CAR COUPLER JERK TEST.

* Abstracts from a report presented to Master Car Builders' Association at Saratoga, N. Y., June, 1894.