

## Westinghouse Brakes: Pearson's Coupling.

### Good Work by a New Zealand Inventor.

The travelling public is mostly composed of the inexpert, so far as engineering matters are concerned; but the average inexpert traveller has at least a vague idea of the principle on which a Westinghouse brake works. He has noticed the hose pipes hanging between the carriages of a train, and he knows that these pipes are in some way connected with the brakes. In rarer instances, he knows that the pipes are used to connect the air-brakes between the vehicles. More rarely still, he knows that if the train were accidentally divided the drawing apart of the hose pipes would cause the brakes to be applied on both sections of the severed train. Here and there among the travelling public, you may even find a man who knows of the existence of a train-cock at each end of the carriage where the hose-pipes are attached. Heretofore, that train-cock has stood for a dangerous weakness in the air-brake system.

If the hose-pipes are disconnected, and the train-cocks left open, the brakes are applied throughout the train. In shunting operations, it is necessary to have an arrangement by which the carriages may be disconnected when required, without the application of the brakes. It is to meet that necessity that the train-cocks are provided.

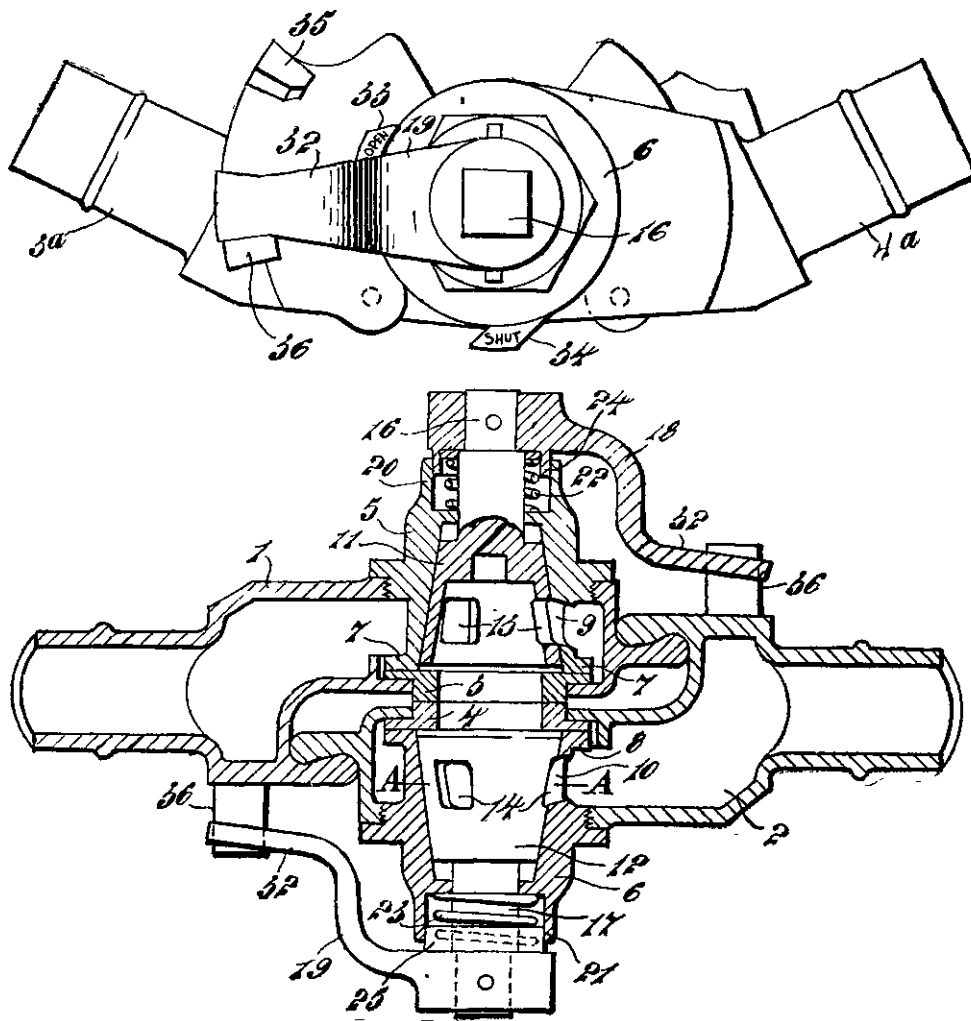
This introduction of the train-cock is recognised as an inherent defect for several reasons; but chiefly because it provides an inlet for the dangerous element of human fallibility. On many occasions the train-cocks have been found to be closed after the hose-pipes have been coupled together, with the result that none of the brakes on the vehicles rearward of the closed train-cock could be applied. This not infrequent forgetfulness of the shunter to open the train-cocks after coupling-up the hose-pipes has caused accidents in the past, and is liable to cause accidents so long as the defect continues. The accident at Rotorua some time ago, when part of a train ran away down a sharp decline, has been attributed to a closed cock—an accident, by the way, which probably cost the Government several thousand pounds. A further risk in connection with these cocks lies in the fact that they can be tampered with by passengers. Out of eleven accidents in New Zealand, eight have been the result of somebody's negligence in leaving train-cocks closed.

Many engineers have endeavoured to overcome this difficulty and to remove this risk. The Westinghouse Brake Company was consulted, and all it could suggest was that the train-cocks should be removed to a position where they could not be tampered with by passengers. The removing of the cocks would, of course, in no way remove or reduce the danger arising from the forgetfulness of shunters. Indeed, it would rather tend to aggravate the danger. The cocks are now handy; if they were removed, it would be a case of out of sight out of mind.

Happily New Zealand engineers were not content to accept the suggestion of the Westinghouse Company as the last word in the matter. Mr. Pearson, the Locomotive Engineer of the Government Railways, being fully convinced that the difficulty could be surmounted, set earnestly to work

to discover how. With his engineering training and his wide experience to help him, his efforts have resulted in complete success. The first definite conclusion he arrived at was that the train-cock in its existing form must go altogether. Next came the question—how to provide a better substitute? As chief considerations in the problem, Mr. Pearson had to devise (1) a coupler upon the hose pipes, which if separated by the accidental severance of a train, would leave the hose pipes open and apply the brakes upon both portions of the train, without injury to the coupler; (2), a coupler which cannot be separated purposely without leaving the brake pipe closed upon both portions of the train; (3) a coupler which cannot be connected together without leaving the brake pipe open. Besides fulfilling these conditions, (4) the coupler should be capable of being

say, without the intervention of train cocks. From the heads, Mr. Pearson removes the usual brass caps, and substitutes therefore the cocks (5 and 6), which have hollow plugs (11 and 12). The stems (17) of these plugs have sided ends (16) fitted with levers (32). Lugs (35 and 36) fixed to the heads are adapted to engage the levers (32), which are so arranged that it is impossible to couple the heads together without entering the levers between the lugs. The result is that before the heads can be coupled together, the cocks are necessarily closed and the levers engaged by the lugs (35 and 36). The action of turning the heads upon one another, while the levers are engaged by the lugs (35 and 36) causes the cocks to open, that is with the ports (13 and 14) of the plugs registering with the ports (9 and 10) in the cocks, leaving the brakes in a condition



PEARSON COUPLING—Side Elevation and Sectional Plan.

fitted upon existing plant, (5) a vehicle fitted with the coupler must be capable of being connected to a vehicle equipped as at present (6), the existing dummy coupler must be employed as at present; (7) the cost of equipping a vehicle should preferably not exceed that of the old system; and (8) when the hose pipes are coupled, the valve which opens the brake pipe must be locked by the action of coupling so that it cannot be interfered with.

This formidable list of requirements, Mr. Pearson has completely met in a most ingenious and comprehensive manner by the mechanism illustrated in the accompanying engravings. The heads numbered 1 and 2 are the standard pattern of the Westinghouse Brake Company, and are attached by their sockets (3a and 4a) to the usual hose pipes, which are connected to the brake pipes of the carriages direct; that is to

ready to be applied. The heads cannot be uncoupled in the ordinary way without the operations being reversed and the cocks left open. If the heads are accidentally pulled apart, as by the severance of a train, the cocks remain open, and the brakes are thereby applied.

The invention has passed through the severest tests upon a vehicle in daily service, running continuously with ordinary traffic, and with complete success. The heads were coupled and uncoupled innumerable times, and at the end of the period are in as good condition as when first fitted.

The value of the invention may be gathered from the fact that there are two and a half millions of vehicles fitted with heads to which the invention can be applied. The cost of equipment is about £1 per vehicle, which compares favourably