

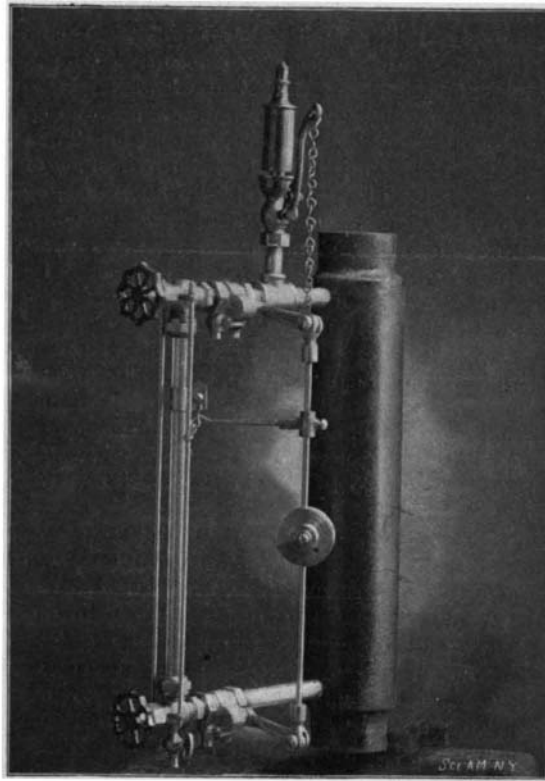
**A SAFETY ATTACHMENT FOR WATER-GAGES.**

Our illustration represents an automatic shut-off and alarm which is designed to cut off the water and steam should the gage-glass break, and to blow a whistle in order to call the engineer's attention to the accident. The device is the invention of William M. McLeish, of New Albany, Ind. The water-gage to which the improvement is applied comprises the usual water and steam inlet pipes connected by a glass. In the pipes are cut-off gate-valves whose stems are provided with arms connected with each other by a rod carrying an adjustable weight. On the rod a bar is adjustably secured by a set-screw. The free end of the bar rests on a support which embraces the glass. When the bar is thus supported the cut-off valves of the water and steam inlet pipes are normally held in open position. If the glass be broken, the support falls, and the weight on the rod connecting the arms of the cut-off valves moves down to close both valves so that the water and steam are shut off. The arm of the upper cut-off valve is connected by a chain with a whistle, so that when the weighted rod moves downward, the whistle will be blown to attract the attention of the engineer.

**SCOTTE TRACTION ENGINE—TYPE SHOWN AT THE PARIS EXPOSITION.**

The exhibit of military automobiles at the Army and Marine Palace shows the great progress which has been made in this direction of late. In France especially, where the automobile industry is now so well developed, it is natural that the Etat Major, which is always on the lookout for the latest improvements, should have given the subject considerable study; and the leading automobile manufacturers have been encouraged in the construction of types of machines especially adapted for army use. Thus the different machines at the Exposition include private vehicles for the officers, moto-cycles for carrying dispatches, mail and telegraph wagons, ambulances, and heavy traction engines. Among the latter the Scottetraction engine deserves special mention, as it is the type which has been used by the army for some time past and has been adopted after a very thorough series of tests. The illustration shows a general view of this machine, taken at the Versailles military station. The machine serves as a tractor or carrier, as it will carry in the rear a load of four tons, but in most cases it draws a train of heavy trucks or army wagons, and can transport from 10 to 12 tons useful load with an average speed of 4 to 4½ miles an hour on ordinary roads, while on good

roads this speed may be increased considerably. The engine has a capacity of 27 horse power nominally, but this may easily be raised to 40 at starting or in hard places. A series of tests of this machine has been made at the Versailles headquarters from 1897 to the middle of 1899 under the direction of the superior officers of the artillery and engineering corps. The tests



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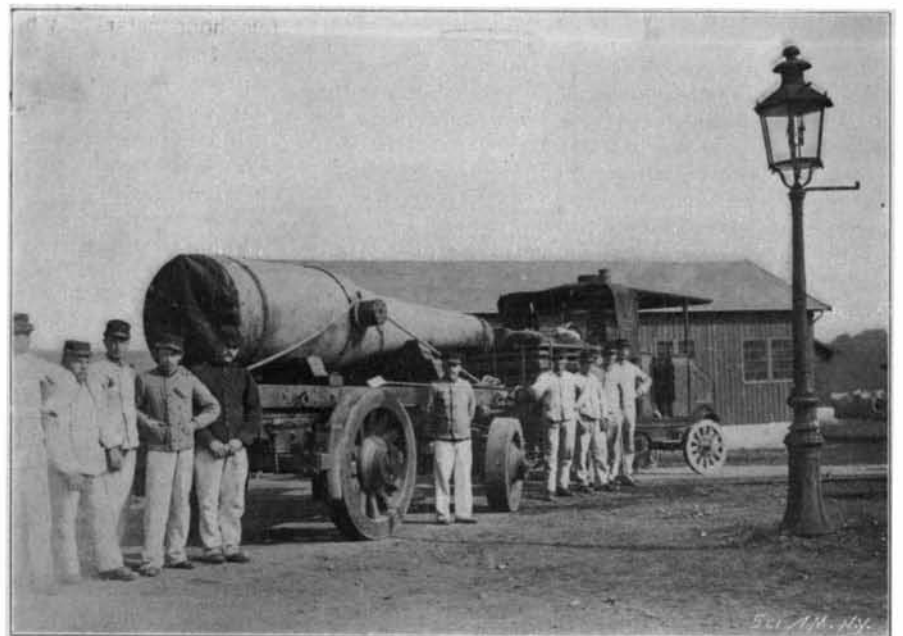
were made in as thorough a manner as possible, as it was desired to establish conclusively the relative advantages of steam and horse traction and obtain a series of data which would serve for future work. The tractors were accordingly put through a series of evolutions according to a carefully studied programme, and the data thus obtained are of great value, considering the high authority of the experts and thoroughness of the tests. The results leave no doubt as to the superiority

of steam traction for the army, and it is likely to become an important factor in future operations. The first road locomotives used in the French army date from 1875, and were of English make; later on, a series of French machines of 18 and 12 tons were used. These, while they gave considerable service in hauling heavy material for the new forts and batteries, presented a great many disadvantages; according to the official reports, they were not powerful enough, presented great defects in maneuvering and direction, and were excessively heavy, so that they were of but little value in mounting grades, and besides they injured the road considerably. From this experience the Etat Major did not look very favorably upon steam traction; but since the tests made with the new machines they have quite changed their opinion, and the reports show that they are now very much in favor of the system, and consider that it will solve many important problems. It may be of interest to cite a part of the official report: "The traction engine, whose weight is not more than six tons, can pass over all of the classed roads in France without deteriorating them, and can enter into fortified places; when drawing a train of wagons, it can make turns of an interior radius of 11 feet and describes with facility all the desired curves. It has the great advantage that the existing rolling material may be drawn by horses or by the tractor without any change whatever; all the types of military vehicles may be thus drawn by the use of hitching devices adapted for the purpose." The photographs show the various purposes to which steam traction is applicable, one decided advantage being that of drawing long trains of wagons; this is shown in the view of the train of ammunition wagons, which is being drawn up an 8 per cent grade, the total weight being in this case 18 tons. In another view is a train of five provision wagons, showing the method of supplying an army in the field. A third view shows the transportation of a 10-inch siege gun to one of the large forts; the weight is here 25 tons.

The reports have established some interesting data as to the advantages of steam over animal traction for army use. Suppose, for instance, that it is desired to transport 250 tons of material over a distance of 36 miles. Horses, drawing heavily loaded vehicles, can make at most 18 miles in one stage, and thus two sets will be needed to cover the 36 miles, making a relay in the center necessary. The tractor can, of course, cover the entire distance when supplied with fuel and water. In the case of horse traction, if each vehicle is loaded with 3 tons and drawn by 6 horses, as is usual



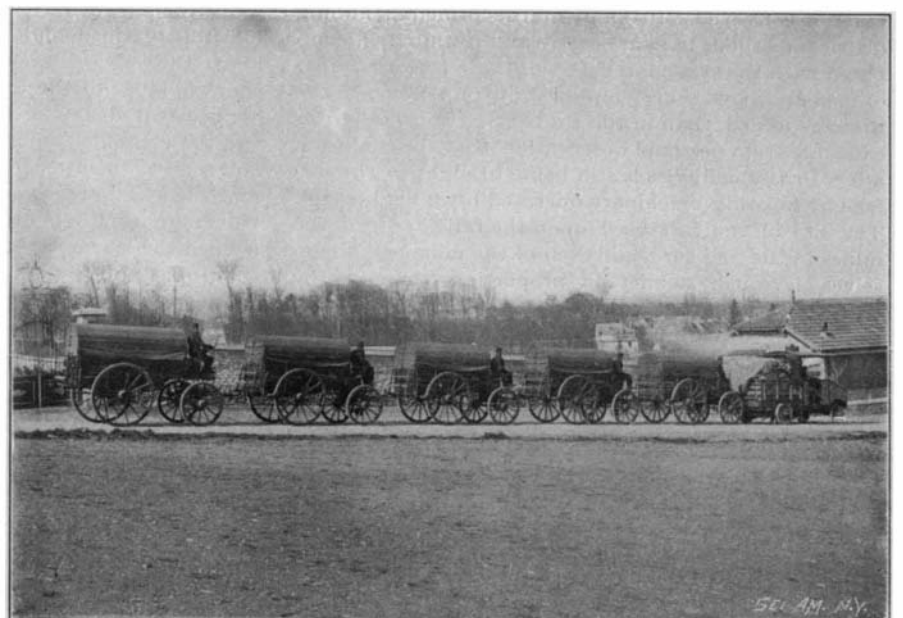
**SCOTTE TRACTION ENGINE AT THE VERSAILLES ARMY HEADQUARTERS.**



**10-INCH SIEGE GUN, WEIGHING 55,000 POUNDS, DRAWN BY SCOTTE ENGINE.**



**AMMUNITION WAGONS ON 8 PER CENT GRADE—TOTAL WEIGHT, 18 TONS.**



**PROVISION TRAIN DRAWN BY SCOTTE ENGINE.**