results that have heretofore been unknown in practical experience. As an example thereof we give a few figures which have been obtained in tests of Schmidt's apparatus :

The Tests were Made by	Type of Engine.	Brake H.P.	Duration of Test.	Steam Consumption.	Coal Consumption.
				Per Brake H.P. per Hour.	
Berlin Steam Boiler Inspection Company	Non-condensing single cylinder compound	3.5	8 hours.	11.7 Kg.	1 90 Kg.
C. Schneider, Chief Engineer		39.0	8 "	7.7 "	0 90 "
G. de Grahl, Engineer		20.0	8 "	8.8 "	1.20 "
Professor R. Schöttler, Brunswick, Geh. Rath. Prof. Lewicki, Dresden		69.0	8 "	7 9 "	1.10 "
Professor M. Schroter, Munich	Condensing engine.	62.0	8 "	5.5 "	0.69 "

" The principal feature of the Schmidt invention lies in the simple arrangement of the superheaters. As shown in the figure, it consists of a steam generator formed of an ordinary upright boiler *A*, upon which a superheater consisting of spiral wrought-iron tubes is placed. The liberated steam enters the lowest coil in a damp condition, and is here dried by the hot gases. From the next to the lowest coil it passes into an upright chamber, *D*, in which it is comparatively quiet, and where an opportunity is given for the conversion of any particles of water that may have been entrained into steam. From here the steam goes into the upper coil and then passes downward through the principal superheater, from the top to the bottom, while the hot gases move in the opposite direction. From the lowest point of the superheater the steam flows out and into the engine. These then are the principal arrangements of Schmidt's superheating boilers, from which such fine results have been obtained. The prominent feature of the construction consists in the fact that the temperature of the walls of the tubes composing the superheater at no time reaches such a point that there is any danger of burning the metal. Therefore the durability of this important adjunct of the apparatus is well insured. Another advantage of Schmidt's boiler is found in that, while the ordinary production of steam from a boiler of such a size would be small, it is so increased in volume by the action of the superheater, that at 350° C. this increase may amount to as much as 35 per cent. above saturated steam of the same weight.

" The steam-engine differs very slightly from those heretofore in use ; it is exceedingly easy to manufacture, and this is especially so in that the cylinder has no stuffing-box and is open upon one end, so that the steam acts upon the pistons alternately. In other respects this steam-engine is built upon the lines of the modern engine, and has, above all, a very sensitive independent governor. In small engines up to 20 H.P. there is a hollow cross-head guide that is really superfluous, and the piston-rods are fastened directly to the inner half of the pistons ; on the larger engines the hollow guide is still retained, but it may be either bored out or flat.

" The lubrication of the cylinder is accomplished by means of a mechanical lubricator in which only valvoline oil should be used, such as is made by Breymann & Hubener, in Hamburg. The other parts are lubricated by the fixed drip oilers, in which any good oil may be used.

" The fly-wheel is of the regulation type and serves to keep the engine steady, and it can also be used as a belt-pulley.

" A feed-pump is attached to the machine, which furnishes the boiler with the water that may be required, passing it through a heater before it enters the boiler, wherein it is heated by the exhaust from the engine. It enters the boiler at a temperature of about 90° C."

A correspondent in whose mechanical judgment we have great confidence, and to whom we are indebted for the circular referred to, writes us :

" The inclosed circular of Gritzner & Co. will give you a general idea of the lines Schmidt is working on. He divides his generator into three zones : 1st, Zone A, boiler proper, has very little heating surface, about 1 sq. ft. per H.P. generates wet steam. This goes into the lower pipes, which form the 2d Zone B, where the steam is dried ; it then passes into a vessel, *D*, and from *D* to the upper pipes which form Zone 3, and are marked *C*, to the engine. The wet steam at 9 atmospheres leaves the boiler at a temperature of 182° C., passes through the pipes *B*, at 230° in the vessel *D*, the water carried over by the steam flashes into steam and leaves *D*, to enter the superheater proper, *C*, at a temperature of 180° or some 50° less than when it entered *D*. After passing *C*, it enters steam-chest of the engine at a temperature of 340°. It is to be observed that the steam enters the superheater at the highest point where the temperature of the waste gases is lowest (250°), and leaves the superheater where their temperature is highest. This point is very important, as it extracts the heat very effectually from the waste gases as they enter the chimney at the low temperature of 250°.

" The engines are single-acting, fitted with long pistons after the fashion of the gas-engine piston. This is necessary in consequence of the great heat of the steam ; with this precaution no difficulty is experienced with pistons or cylinders. The heating surface of the superheater and steam drier is four times as large as the wetted surface of the boiler. The 150 H.P. engine is fitted with double heat valves of the Sulzer type. You will agree with me that the Schmidt motor is a very original scheme.

" This subject is being steadily investigated over here. I was present at the trials of one of these engines, made by my friends, Messrs. Gritzner & Co. The engine is of 150 H.P., and runs at 150 revolutions per minute. The trials lasted three days, and were superintended by Professor M. Schröter, of Munich. A consumption of feed-water of 4.6 kilograms (10.3 lbs.) per indicated H.P. was found. This beats the best records obtained by Sulzer's or the Allis Company with triple-expansion engines. The engine is a compound condensing, not particularly well built either. Small non-condensing engines built by the same firm on the Schmidt principle show a consumption of feed-water per *brake* H.P. of about 8 kilograms (17.8 lbs.). This is most extraordinary for engines under 20 H.P."

ACCIDENTS TO LOCOMOTIVE ENGINEERS AND FIREMEN.

The object of publishing this monthly list of accidents to locomotive engineers and firemen is to make known the terrible sacrifice of life and limb that is constantly going on among this class of people, with the hope that such publications will in time indicate some of the causes of accidents of this kind, and to help lessen the awful amount of suffering due directly and indirectly to them. If any one will aid us with the information which will help make our list more complete or correct, or who will indicate the causes or the cures for any kind of accidents which occur, they will not only be doing us a great favor, but will be aiding in accomplishing the object of publishing this report, which is to lessen the risk and danger to which the men to whom we intrust our lives are exposed.

The only, or the chief source of information we have, from which our report is made up, is the newspapers. From these the following list of accidents, which occurred in December, has been compiled. Of course we cannot report those of which we have no knowledge, and doubtless there are many such.

ACCIDENTS IN DECEMBER.

Rochester, N. Y., December 1.—Robert Watt, fireman, and John Evans, engineer, were badly scalded by the collapsing of a tube on their locomotive while hauling a passenger train on the New York Central & Hudson River Railroad, near Grimesville this morning.

Lockport, Pa., December 2.—A collision occurred near here on the Central Railroad of New Jersey this morning between a coal and a freight train. The engine of the coal train was ditched, and the engineer, George W. Hull, was pinned beneath it and instantly killed. Lewis Gordon, the fireman, had both legs broken, and will probably die.

Alexandria, Va., December 3.—An engine hauling a local train on the Pennsylvania Railroad from this city to Washington jumped the track on the Long Bridge this morning. It plunged down a slight embankment and pinned Fireman W. T. Walker beneath it, killing him instantly. The engineer went down with the engine, but escaped with a slightly cut head.

Wilmington, S. C., December 6.—A collision on the Carolina Central Railroad occurred near Rockingham this morning between a freight train and a mixed passenger and freight train. Ellis Wells, engineer of one of the trains, was scalded to death, and the engineer of the other train was fatally injured.

Hartford, Conn., December 6.—A collision occurred on the New York & New England Railroad at this point this morning between a passenger train and a switching engine, in which Engineer Lewis of the switching engine was crushed to death,