

## AUTOMATIC STEP-LADDERS.

Small inventions are not always the least useful, and a proof of the fact is furnished by the automatic platform step-ladders recently constructed by M. Bardin, of Billancourt, France. Since its invention in antiquity, the ladder, despite its manifold applications and manifold inconveniences, has scarcely changed in its general construction. It would seem, even, when we come to think of it, that it would be hardly possible to change anything in it. Such is not the case, however, as we shall see from the description of the Bardin ladder. This ladder, of which there are two types, of different size, one with steps and the other with rungs, is ordinarily double and composed of four uprights, hinged so as to fold together, and of a movable platform that is usually surmounted by a tool-box.

When folded, the platform lies flat along the steps of the ladder, and, when the latter is opened, slides to its proper position in two grooves so formed that at a given moment it is arrested and becomes more rigid in proportion as the weight supported by it is heavier. As may be seen, the mechanism is very simple. On the other hand, this new ladder has the merit of being extremely safe. There is, in fact, no danger of the sudden spreading of the uprights as a consequence of the breaking of the rope that keeps them in place. The equilibrium is assured by the platform itself. This latter possesses such stability that the person who has to stand upon it for some length of time can not only perform the kind of work that he has in hand with absolute safety, but also with as much facility as if he were stationed upon a scaffold. This is a great advantage for all joiners, locksmiths, plumbers, gasfitters, lamp-lighters, electricians, paper-hangers, painters, decorators and others who, through the exigencies of their work, are obliged to remain for a considerable length of time at the top of a ladder. Any one—man, woman, or child—can, in fact, stand erect and move about upon the platform with perfect safety, and that, too, so much the better because that, at the level of the hand, there is a box with a cover in which to deposit tools or other accessories, and the uprights form a guard rail at each side of the platform.

The ladder, when folded, occupies no more space than an ordinary one. The platform fits into and entirely disappears in the space between the uprights.

The new ladder is adapted not only for industrial purposes, but in the country is capable of rendering great service in horticulture for the picking of fruit, pruning of trees, etc. It likewise very advantageously replaces rolling ladders, which are genuine war machines as expensive as they are inconvenient, and also simple or double ladders, upon the rounds of which a laborer, with an insecure footing and with his mind always preoccupied with the danger of a fall, works with difficulty and irregularity. There are some special forms of the ladder designed for artists, hunters, military men, lawn-tennis players, shop-keepers, bill-posters, book-sellers, photographers, and for use in store-houses, government archives, railway stations, etc.

## GASOLINE-MOTOR-PROPELLED FIRE ENGINE.

BY OUR ENGLISH CORRESPONDENT.

A gasoline motor chemical fire engine has been constructed for Leicester, England, by the Wolseley Motor Car Company. Owing to the hard nature of the work which this appliance has to fulfill, the vehicle has been designed upon substantial lines. The chassis is built of channel steel of heavy section reinforced with stiff gusset plates and transverse members, riveted together. The wheel base is 9 feet 6 inches, and the track 4 feet 9 inches.

The wheels are of a special type. The rear wheels are slightly larger than the front, being 40 inches and 36 inches in diameter respectively. The wheels are of the wooden artillery type, but

are specially reinforced with heavy wire spokes. The advantage of this arrangement is that not only is there additional strength in the wheel, but it can withstand very severe side strains, such as collisions with projections in the roadway, or the edging of the sidewalks, and the danger of collapse through rounding corners at high speed is appreciably reduced. The driving wheels are shod with heavy solid tires, while the front wheels are fitted with thick pneumatic tires to support the

forward and one reverse are provided, the forward gear giving speeds of 7, 11, 15, and 20 miles per hour respectively. The transmission is through the ordinary cone friction clutch mounted on the crankshaft and connected by a chain to the gear-box. Chain drive from the countershaft of the transmission to the sprockets on the road wheels is employed. Adequate double-acting brakes, both foot and hand, acting on the drums cast on the sprockets of the road wheels, are provided. The gasoline tank has a capacity for 10 gallons. The chassis is constructed to carry safely a load up to 28 hundredweight and the total weight of the chassis is 20 hundredweight.

In the front of the engine is fitted a large double-beat alarm gong to give warning of approach along the streets.

The body is of substantial build, with seat in front for two men, including the driver, with a box seat at the back to accommodate two more on either side. At the rear of the chassis is a step for the accommodation of a fireman, and sufficient space for two first-aid chemical cylinders. Brackets are fitted on either side to carry a short ladder, while the equipment of the engine is completed by a chemical cylinder and hose reel.

## Count Zeppelin's New Airship.

Count Zeppelin's new airship is gradually nearing completion. It will be remembered that three years ago Count Zeppelin made experiments in aerial navigation which attracted much attention. Unfortunately, the experiments were not successful, and the Count lost a small fortune on the affair, the balloon and its accessories being eventually sold by weight in Germany.

Count Zeppelin, however, was not discouraged, and at once set to work to interest a financial syndicate to aid him. Many sportsmen also came to his assistance, and in two years \$25,000 was subscribed in Germany toward the Zeppelin balloon fund, and several German manufacturers offered to supply the necessary materials at a low price or quite free of charge.

Then the Imperial War Office was approached, which at once placed materials and experts of the balloon department at the

Count's disposal, it is said at the express wish of the Kaiser.

The King of Württemberg is also taking the keenest interest in the enterprise, and some months ago went specially to Friedrichshaven to examine the works on the spot.

Although the cost will be nearer \$50,000 than \$25,000 to complete the airship, subscriptions are coming in freely, and there is no likelihood that work will be stopped owing to want of funds.

The new balloon will be somewhat smaller than the last one, which had a total capacity of 14,000 cubic yards and carried nearly three tons of water and ballast.

The motors to drive the airship will be much greater in force, their combined propelling power being eighty horse-power.

There will be two large cars attached capable of carrying eight to a dozen persons.

Now that the conversion of railroads to electric traction is rapidly taking place, involving in the majority of cases the laying of the third supply rail, it is desirable that means should be adopted to prevent employes coming into contact with the same. An ingenious protection for the live conductor rail has been introduced upon the market by an English engineering firm. The idea comprises a complete system of insulated protection for the live rail, unaffected by varying climatic conditions. Strong arched or semi-arched sections of metallic shields are attached to special insulating blocks attached to the live rail. These shields are fitted in lengths, so that in the event of an accidental contact, the current is confined only to the length of the part affected.



Ladder Arranged for Artists' Use.



Using the Platform of the Ladder Against a Wall.



How the Lamplighter Uses the Ladder.



The Artists' Ladder Folded.



Arrangement of the Ladder for Photographic Use.



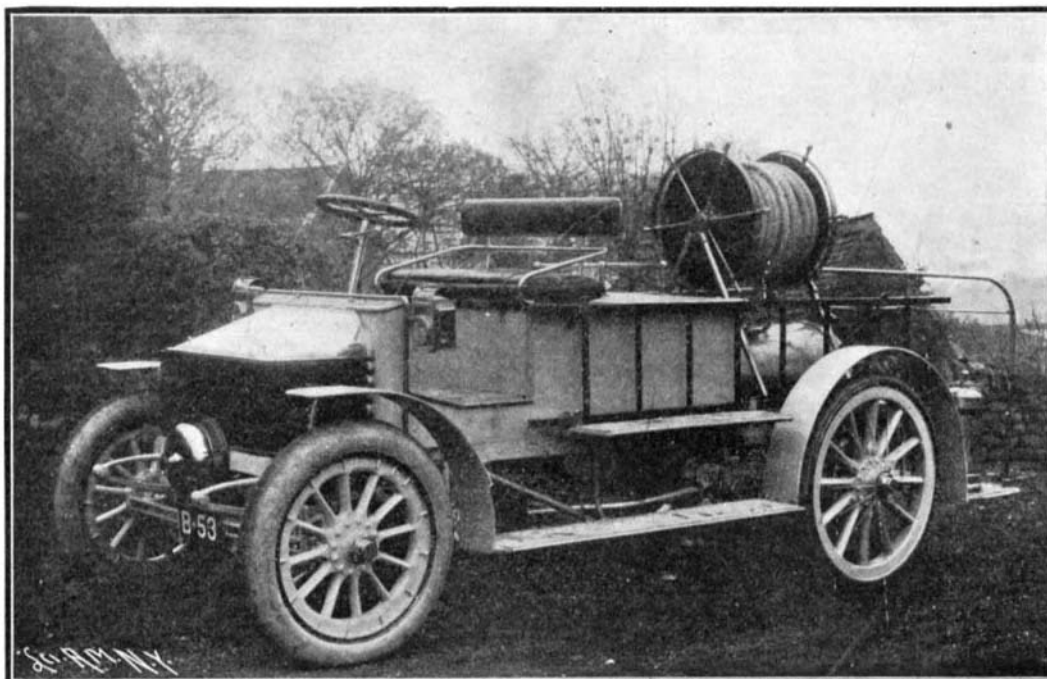
How the Ladder is Carried.

## AUTOMATIC STEP-LADDERS.

heavy weight of the vehicle. The wheel hubs run on plain phosphor-bronze bearings and the axles are made in one piece of best steel.

The car is driven by a four-cylinder horizontal engine, developing 24 horse-power, running at a normal speed of 750 revolutions per minute. A single float-feed spray vaporizer is employed, while the ignition is of the ordinary high-tension type with accumulators and trembler coil. Cooling is effected on the usual system, the water from the engine passing into a battery of flanged radiating tubes and being cooled by a current of air induced by a high-speed fan driven by the engine. The water then passes into the tank and thence to the engine.

Ample lubrication is effected from the dashboard to all parts. The change speed gear is of the general sliding type, a new pair of wheels being brought into action each time the speed is changed. Four speeds



CHEMICAL FIRE ENGINE PROPELLED BY A 24-HORSE-POWER GASOLINE MOTOR.