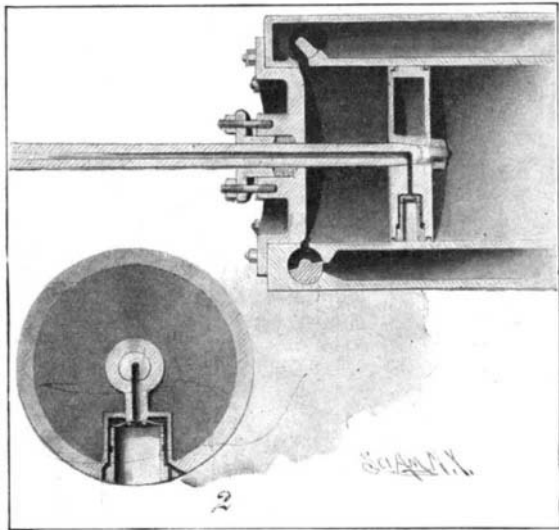


A FLOATING PISTON.

A recent invention provides a simple and effective means for sustaining the weight of a piston in a horizontal cylinder so as to reduce friction to a minimum and prevent the cylinder from wearing oval, which would cause leakage of steam or other fluid from one side of the piston to the other. The accompanying



A FLOATING PISTON.

illustrations show clearly the means provided, Fig. 1 being a longitudinal section through the center of the cylinder and piston and Fig. 2 representing a transverse section through the piston head. It will be observed that the piston rod is hollow and connects with a passage extending at right angles therewith to a chamber opening onto the peripheral face of the piston head at its lower side. Steam or air is admitted to this passage through the hollow piston rod, and this pressing against the cylinder sustains the weight of the piston head. In order to prevent the escape of the fluid from the pressure chamber, the latter is provided with a sleeve having a packing ring and an enlarged lower portion adjacent to a vent tube formed in the piston head and leading to the peripheral face thereof, to lessen the pressure per square inch on the bottom of the cylinder. Now, by the arrangement described the pressure on the top edge of the sleeve will force the same downward for the outer end to engage the cylinder, so that the fluid cannot escape from the pressure chamber to either face of the piston. The sleeve is also pressed on the top edge by springs secured to the pressure chamber, as plainly indicated in the drawings. This arrangement will be found very useful on steam engines of high and low pressure and for heavy trunk pistons of air compressors driven by gas engines. It can also be used on locomotives, as they have a constant pressure of air which may be

utilized to float the piston without waste. A patent for this invention has been granted to John C. Junkin, of Grafton, N. D.

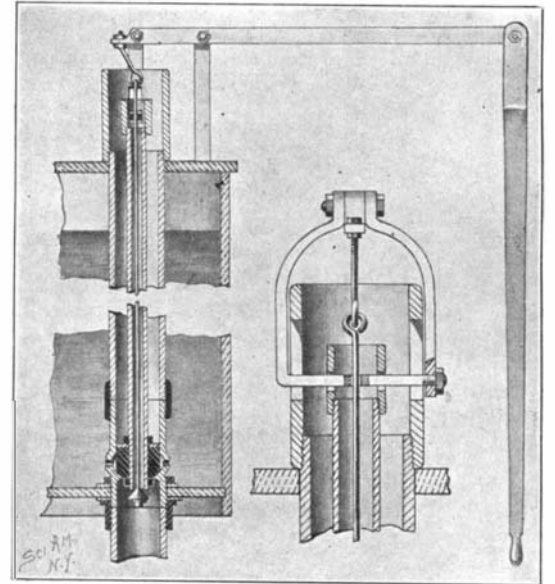
A NON-FREEZING VALVE.

The improved discharge valve for tanks which we illustrate herewith is so arranged as to prevent freezing of the parts in cold weather. The invention, which is to be accredited to Mr. P. J. Leithauser, of Clarendon, Texas, provides for the draining of water from the valve and the free circulation of air to absorb all moisture collected on the parts. The valve operates in a pipe which extends through the tank, the lower end being threaded into a short pipe section which contains the valve seat and also the ports for the outlet of the water when the valve plug is lifted. This pipe section connects at the bottom with a discharge pipe. The valve plug is secured to a hollow stem open at the bottom and passing up centrally through the main pipe. Within the hollow stem is a valve rod which is provided with a secondary valve arranged to close the bottom of the hollow stem when the main valve is lifted. This rod at the top is connected by a link with the valve-operating lever, and the latter is also connected by a yoke with the main valve stem, as shown in our enlarged detailed view. The cross arm of the yoke, however, is permitted a small amount of play in the top of the valve stem, so that on operating the lever the secondary valve is first raised to close the bottom of the stem and then the main valve is lifted. On releasing the lever, after the main valve is seated, the secondary valve opens. Just above the main valve plug the valve stem is perforated, and through these openings any water collected in the upper pipe may flow out by way of the secondary valve into the discharge pipe. These perforations also permit free circulation of the air and prevent accumulation of moisture, which on freezing would render the valve inoperative.

SOME INTERESTING MODELS.

BY H. D. JONES.

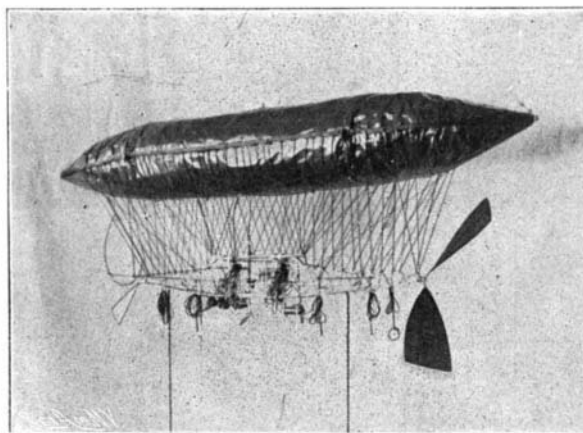
Model making is the hobby of Dr. Frank H. Brandow, president of the Berkshire Automobile Club, of Pittsfield, Mass. We reproduce in the accompanying illustrations a number of exquisitely made models turned out by Dr. Brandow in his private workshop.



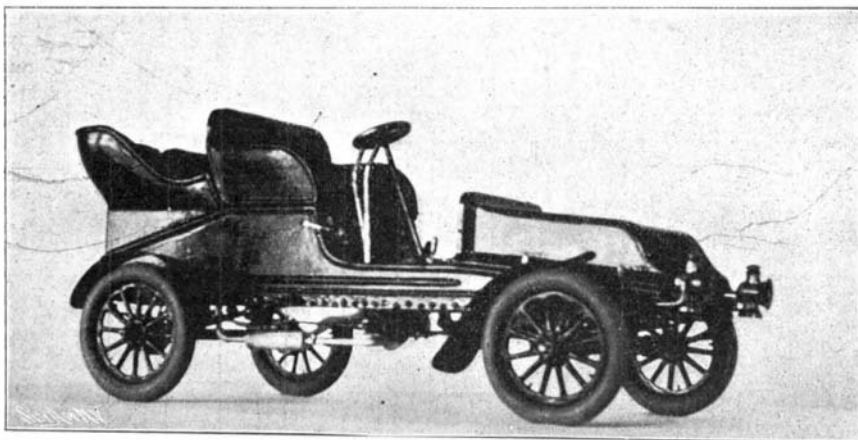
A NON FREEZING VALVE FOR TANKS.

These models were made during leisure hours, and show mechanical skill and ingenuity of a high order.

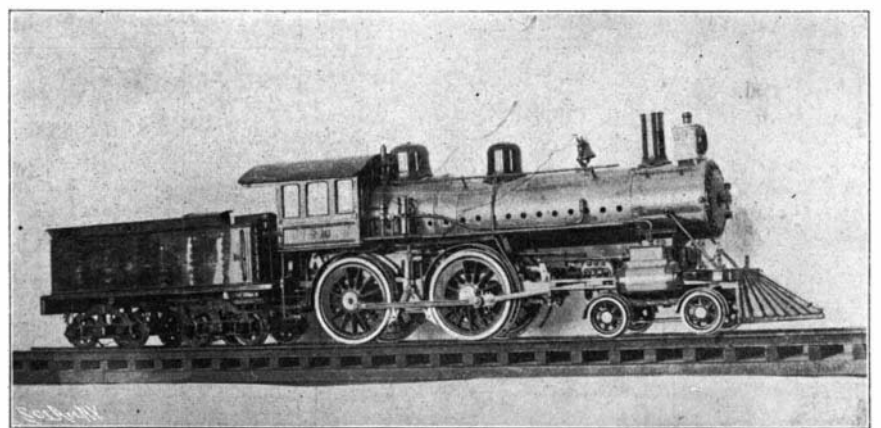
The model of the locomotive "999" weighs about 65 pounds. It is a perfect working model. It differs from the full-sized engine only in being fitted with a brake that works by steam instead of air pressure. Steam for the brake is supplied from a tank just above the forward truck, the tank generally used for air pressure in the Westinghouse brake system. The engine is built of brass, bronze, silver, copper, nickel plate, cast iron, aluminium, and gold plate. There is no woodwork in its construction. The tank is built of burnished copper riveted in the usual way. The headlight is supplied with a two-candle-power electric light, connected with a battery kept under the coal in the tender. The holes drilled in the boiler at the side and the bottom are used for draft for the alcohol burners used to make steam, it being impossible to generate steam in so small a boiler with flues on account of lack of draft. The crown sheet runs the entire length of the boiler, giving large heating surface for steam. The boiler runs on a pressure of from 40 to 60 pounds. Dr. Brandow was a year and a half in making this model. There are several thousand pieces, counting all the small parts. The hand brake in the tender and all the



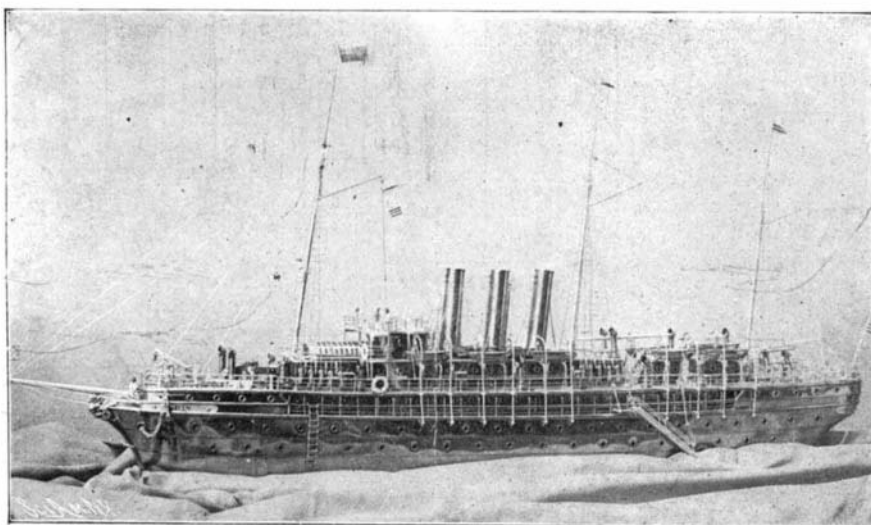
Model of an Airship.



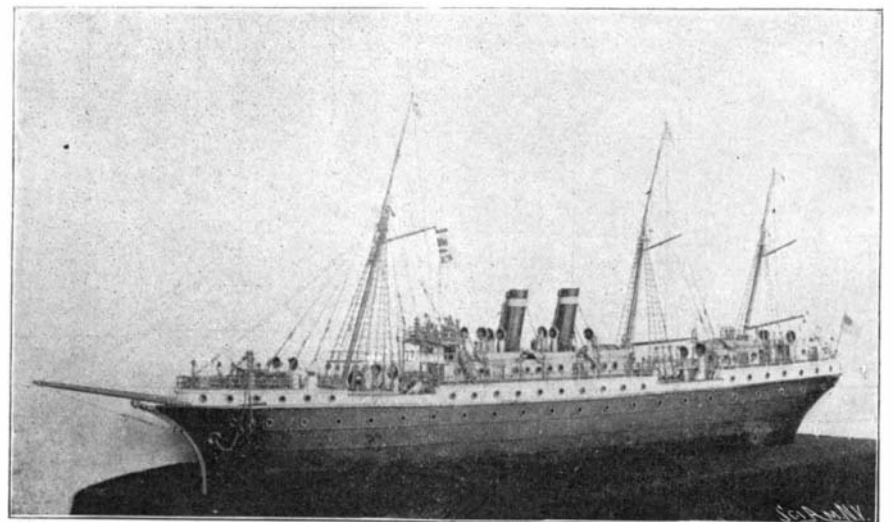
Working Model of a Winton Touring Car Exhibited at a Recent Automobile Show.



A Working Model of Engine 999. Weight 65 Pounds.



Model Constructed of Brass, Iron, Silver and Gold.



Model of an Ocean Liner.

AMATEUR MODEL MAKING.

pipings, for steam, water, and air, with the small valves used in their construction, are perfect copies of the large machine. A metallic engineer stands at the throttle. All the parts are beautifully polished and buffed.

The "Mascot" is a model built on the lines of one of the American Line ships. It resembles the "City of Berlin," but is not an exact copy. The crew of the ship were imported from Dresden, Germany. Every line is a faithful reproduction in miniature of an ocean-going ship. Ten lifeboats hang from the davits, each with a block and fall ready for immediate launching. The bridge is connected with the engine room by electric telegraph, the captain and the two mates being posted in their places as though directing the course of the craft. In the chart room, under the bridge, stands the quartermaster holding the spokes of the wheel. Real compasses are at the service of both bridge and wheelroom officials. The sidelights are fitted with two-candle-power electric lamps. The engines are all fashioned in perfect form. The hull is built of copper. The doctor was eight months making his model. A previous effort on the same lines, representing the "City of Paris," was sold to Mr. John Hood, of Buffalo, for \$1,000.

Dr. Brandow is an enthusiastic chauffeur, and has made several working models of automobiles, some of which were on view at the recent Automobile Show. His latest work is a model of an airship, which is worked by a machine that enables the propeller to run for an hour. The doctor is now at work on a new Winton automobile, which is about half finished.

THE AUTOMOBILE AS A PLOW HORSE.

BY W. FRANK M'CLURE.

An interesting experiment was recently tried on the Raser estate at Ashtabula, Ohio, where sparks from a passing train on the Nickel Plate Railroad had set fire to the grass in the adjoining meadows. To cope with the fire plowing was necessary, and the horses not being available at that hour, the owner's automobile was pressed into service. Ropes from the ends of the singletree were attached to the rear axle of the machine. Mr. Raser held the plow-handles, and his brother operated the automobile. Furrows were turned as shown in the picture; but it was found to be impossible to operate the machine slowly enough to get the best results. In order to do this, it would be necessary to gear down the machine to a slower rate of speed. The tendency of the plow was to skim the ground in places, and it was with difficulty that the man at the plow handles could keep up. The automobile, however, served the place of a plow horse sufficiently well for the purpose of breaking up the surface of the ground, and the work was done more rapidly than it could have been in any other way.

The first test led to another in a few days, when an acre and a half of grass was to be mowed. Here too it was found impossible to operate the machine as slowly as was desirable. However, it was proved that a piece of grass which would require three hours with horses could be mowed in one hour with an automobile



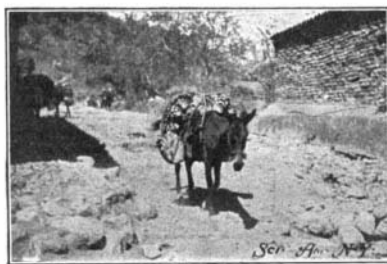
Collecting Pulque.



Roasting Agave Hearts Over Baking Pit.



Filling the Fermenting Vats.



Transporting Agave Heads to the Distillery.

THE PULQUE AND MESCAL OF MEXICO.

as the motive power. On account of this saving of time, the owners will continue to use the automobile for mowing purposes. The machine, which is of the gasoline type, weighs 1,800 pounds, and has a seating capacity for four persons.

The experiment created considerable interest wherever it became known, and raised the question as to whether or not an ordinary automobile can be successfully used for agricultural purposes. There would not seem at first thought to be any inherent difficulties, to prevent such use under favorable conditions. The great bearing surface of the tires, the high frictional coefficient of rubber on fairly dry soil or grass, coupled with the weight of the average machine, should render it equal to ordinary plowing or mowing.

THE PULQUE AND MESCAL OF MEXICO.

BY CHARLES RICHARD DODGE.

The American tourist journeying by rail over the plains of Apam, on his way to the city of Mexico, will be surprised to observe the vast plantations of the *maguay* which stretch away on either side as far as the eye can reach. For fifty to one hundred miles, on the different railways, will be seen little else than these Agaves, in all stages of growth from the young plants newly set out—a couple of yards or more apart—to those of mammoth

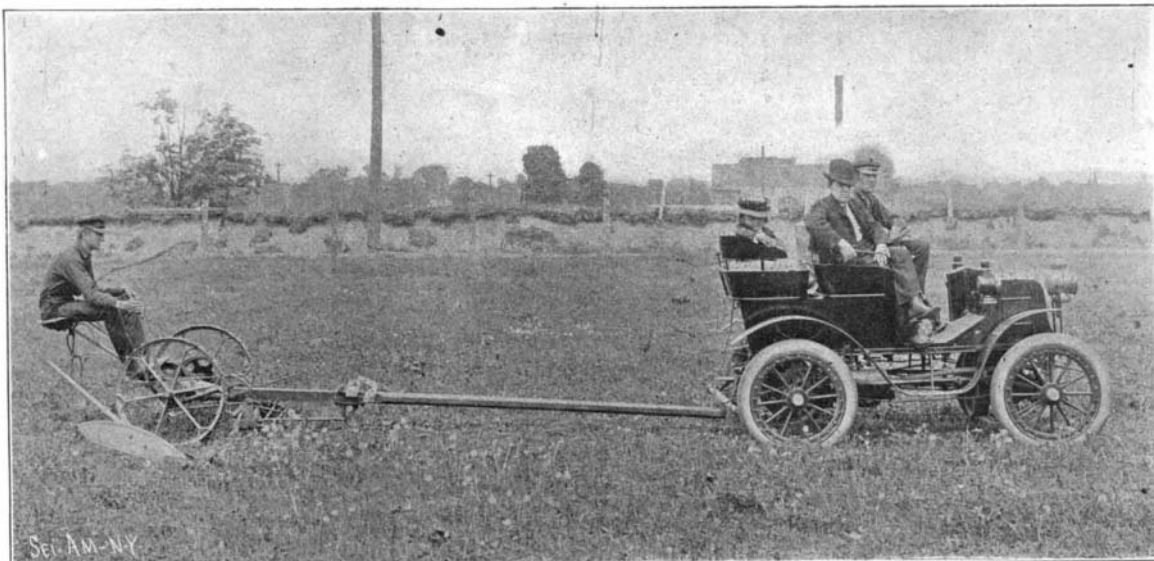
size which are seven or eight years old.

These immense plantations supply the Mexicans of the capital—and of other cities as well—with the drink known as *pulque* (pronounced *pull-key*) which is a national beverage. There are upward of a thousand shops in the city of Mexico where pulque is sold, and hardly a railway station within a hundred miles of the city where the traveler will not be importuned to buy from the boys and women who bring it to the trains in pitchers and jugs of red pottery, dispensing it at a penny or two for a cupful.

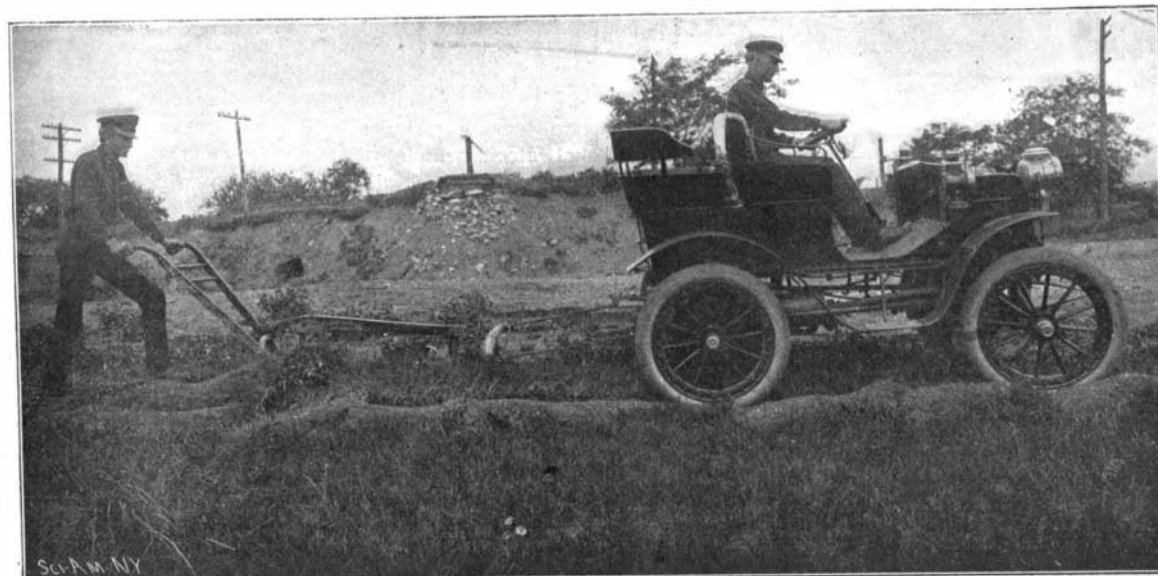
On the Mexican Railway, one of the systems connecting the capital with Vera Cruz, a special train is run over the line every morning, laden only with pulque, in barrels and skins, suggesting the milk trains of this country; and it is said that the daily shipments by this train amount to over one thousand dollars. So extensive is the industry that the *maguay* plantations of the three states of Hidalgo, Tlaxcala, and Puebla are valued at nearly \$15,000,000, while the railways have carried over 80,000 tons of pulque in a single year.

Many species of the genus *Agave* produce pulque, these belonging to the *Americana* group of *Agaves*, though two species, *potatorum* and *salmiana*, are the most important, as I was informed by a Mexican botanical authority. The century plant, of our greenhouses, is a *maguay*, and one has only to imagine a century plant, with massive leaves five or six feet in length, to know how these pulque *maguays* look. They grow to perfection on the high plateau of central Mexico, where the elevation averages about 7,000 feet above the sea level.

When one of these plants reaches maturity its tendency is to flower—throwing up an immense mast or stalk sometimes 25 feet high, upon the branches of which, at the top, the blossoms appear. The pulque operator is always on the alert for indi-



THE AUTOMOBILE AS A PLOW HORSE.



PLOWING WITH AN AUTOMOBILE.