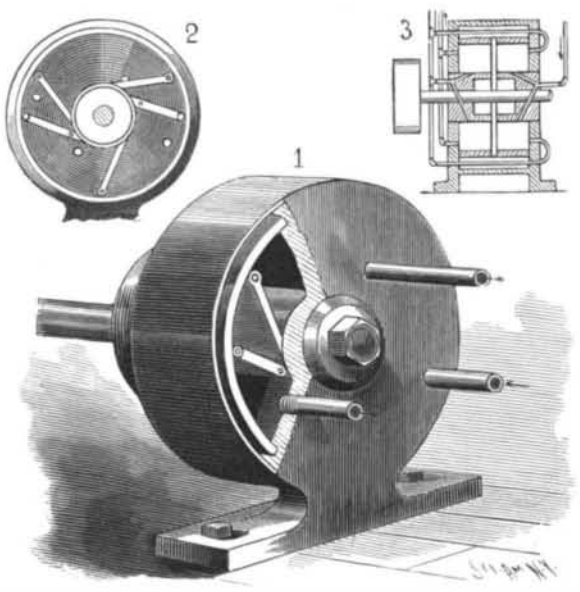
A NEW ROTARY ENGINE.

Of the accompanying illustrations, Fig. 1 represents a perspective view of a new rotary engine with a portion broken away to show the interior, Fig. 2 a sectional side elevation with the piston-heads and abutments in position, and Fig. 3 a modification in section, showing a compound engine.

The engine is provided with a casing formed with a hub against which abuts a wheel-like piston having a solid web and a rim concentric with the hub. The piston thus forms an annular working chamber with the casing. Piston-heads are pivoted near their outer ends to the web of the piston and are mounted to swing in the working chamber. The inner ends of the piston-heads are provided with friction rollers which travel on the surface of the hub. Abutments are pivoted near their inner ends to the hub at opposite points. At their outer ends the abutments carry friction rollers traveling on the inner surface of the piston rim. The abutments and piston-heads are so arranged that when the piston rotates, the piston-heads swing outwardly, so as to pass the inwardly swinging abutments. Oppositely arranged inlet ports open into the working chamber at a point forward of the abutments. Oppositely arranged outlet ports open into the working chamber at the rear of the abutments. When the steam enters the inlet ports, it presses against the piston heads, which have their rollers against the hub and their outer ends against the piston-rim. Similarly, the steam acts on the abutments so as to hold their friction rollers on the piston rim. The action of the steam on the piston-heads causes the piston to revolve. The piston simultaneously receives a like impulse from the steam passing into the space between the corresponding abutments and piston-heads. When each piston head passes an exhaust port, then the steam in the rear of the piston-head can exhaust. As each piston-head passes over an exhaust port, another piston-head passes the preceding inlet port, thus giving impulses imparting a continuous rotary motion to the piston.

The engine has been patented by William Willerton and Thomas Shortliff, of Blackfoot, Kipp P. O., Montana.



WILLERTON & SHORTLIFF'S ROTARY ENGINE.

AUTOMOBILE CARRIAGE FOR WINTER USE.

Our engraving shows an interesting modification of the automobile carriage for winter use on snow and ice. It is the Bollee gasoline carriage adapted for running on hard winter roads by being mounted on steel runners, and the driving wheel being provided with a wooden rim, studded with conical points, this rim being substituted for the pneumatic tire on the driving wheel. The carriage was rebuilt for winter use by Dr. E. Casgrain, of Quebec, Canada. It is an interesting development of the automobile vehicle and opens another field for those who are working on the important problem of automobile propulsion.

The Bollee carriage has an enviable reputation in France, where it is made, as a thoroughly practical vehicle. The ordinary Bollee carriage is illustrated in the SCIENTIFIC AMERICAN for October 17, 1896. It is a machine of the tricycle order, with two steering wheels in front and the driving wheel behind, but in Dr. Casgrain's modification steel runners are substituted for the front wheels. It is characterized by a very low form, which assures great stability, which is an added advantage for use in winter, when the inequalities of the road are more apparent than in summer. There are two seats; and the motor and the gasoline reservoir are in the rear, the former being upon each side of the driving wheel. The frame of the carriage is formed entirely of hollow tubes. The gasoline reservoir has a capacity of seven quarts—sufficient for a run of fifty miles. The gasoline descends to the carbureter by gravitation, passing through a Panhard and Levassor flow regulator containing a hollow brass float that follows the movement of the liquid. A conical plug closes the inlet orifices when the influx of the liquid is too great. After the gasoline reaches the carbureter it spreads over a bronze cap and is reduced to an extremely fine state of division, and in this form is carried along by a current of air regulated by a clack valve. By means of a rod it is possible to uncover the holes of this valve more or less, thus modifying the composition of the gaseous mixture in such a way as to render it explosible, thus adapting the explosive mixture so as to run the motor at the desired speed. Ignition is effected by means of a platinum igniter heated by an external burner. The motor is of the four-cycle type and it develops two horse power. The cooling is effected through heat regulators having lugs cast upon them as shown in the engraving. The connecting rod and crank move in a bath of oil. The velocity of the motor is regulated by an apparatus which acts upon the exhaust valve, which, when the motor is running wild, prevents the lifting of this valve and, consequently, an expulsion of the burned gases and the introduction of a new charge at the succeeding revolution.

While the motor runs normally, the valve is directly controlled through the medium of the levers and rods by a box fixed upon an axle parallel with the driving one. This box actuates a link and transmits motion to the valve. The valve is pulled back by means of springs. The gases, after their egress from the cylinder, pass into an exhaust cylinder designed to deaden the noise and are finally expelled. The motor is stopped and started by an ingenious device. The axle of the driving wheel is movable backward and forward through the intermedium of a lever placed at the left of the driver. This lever moves opposite a toothed sector at whose notches it may be arrested. The motion of the driving axle is communicated to the wheel by means of a drum keyed to a hollow shaft that receives its motion from the driving axle. This drum, through a rubber belt, carries along another and larger one that is dependent upon the wheel. When the lever is shoved backward, the driving wheel moves forward and loosens the belt, which can then no longer rotate the wheel. At the same time the latter applies itself against the fixed brake block and is arrested on the spot. But if, on the contrary, the lever is shoved forward, the wheel moves backward and stretches the belt, and an opposite effect is produced. This arrangement has the advantage of obviating the inconvenience of the stretching of the belt, since, in order to tighten it, it suffices, upon starting, to push the lever one notch forward. The carriage is provided with a train of three different gearings, that permit of obtaining speeds for five, nine and fifteen miles an hour. As may be seen, the person who sits in front does not aid in the steering of the vehicle. The steersman sits behind, his feet resting on each side upon a platform provided with a straw mat. He merely has to move his foot backward in order to press the lever of a powerful brake whose block is tangent to the circumference of the driving wheel. With his right hand he steers the vehicle through a hand wheel, which, by a very simple gearing, turns the fore wheels to the right or left.

DR. CASGRAIN'S BOLLEE CARRIAGE FOR WINTER USE.

The Perplexing Gas Meter.

Most gas consumers on this side of the Atlantic have like experience to a facetious correspondent in The London Graphic, who asks as follows: Can anyone tell me if gas meters suffer from aberration of intellect, and if so whether there is such an institution as an Asylum for Demented Gas Meters? If so, I should be very glad to hear of it, and at once institute a commission de lunatico inquirendo, and have the case of my especial meter thoroughly investigated. I have spoken before of the difficulty of tackling even a sane meter. I know a great many very clever people, but there is not one among the lot understands the language of a meter, even when it is in its right mind. Give the most well-informed person of your acquaintance a ladder and a candle and tell him to climb to your meter and inform you how much gas you have burned, and you will find him absolutely puzzled. What then can you do with a mad meter, one that persists in registering an increase of gas every quarter, though you feel certain that you consume nearly the same quantity in every corresponding period of each year? If the management of meters and the reading of the same were taught in schools, it would be better than much of the useless learning which is crammed into children's heads.