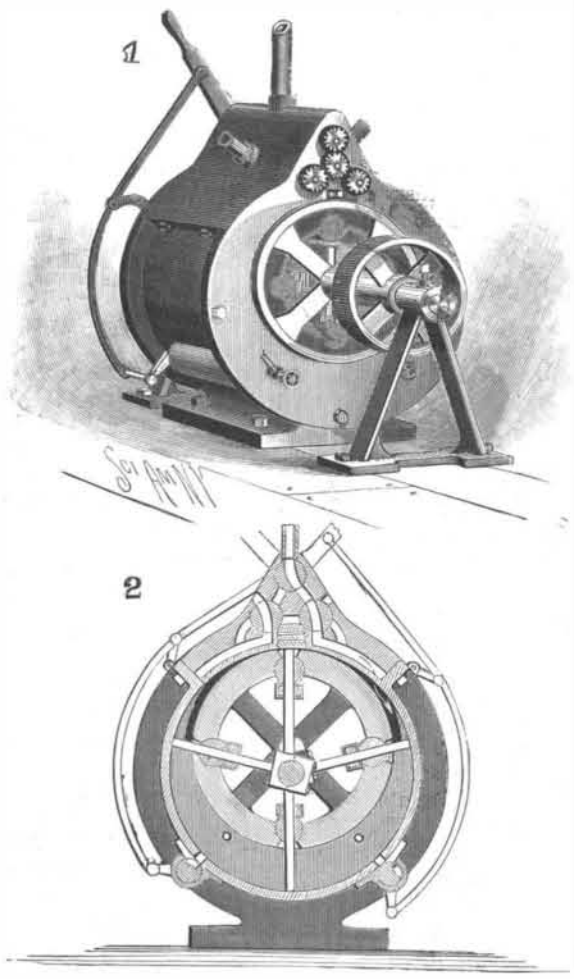
AN IMPROVED ROTARY ENGINE.

An easily reversible, simple and compact rotary engine is that which has recently been patented by Reuben P. Jarvis, of Smith Center, Kansas. Mr. Jarvis' engine, of which we present perspective and sectional views, consists of a cylinder in which a piston is eccentrically mounted, the peripheral surface of which is in contact with the cylinder at a packing held in a recess of the cylinder and adjusted toward the periphery of the piston by two wedges which slide upon each other and are controlled by two set screws. The piston is provided with a number of piston heads, as shown in the lower illustration, all pivotally connected at their inner ends with a crank arm secured on the shaft. The piston heads extend through slots in the rim of the piston and are fitted to slide in trunnions mounted to rock in bearings attached to the piston. On each trunnion is secured a packing for making a steam-tight contact joint between the abutment and its trunnion. The packing is provided with a casing fastened to the trunnions and containing packing plates fitted upon the side faces of the piston head, and engaged at their outer surfaces by bars pressed up against the packing by set screws working in the casing. By this arrangement the engineer is enabled to screw the packing plates into firm contact with the piston heads, thus preventing the leakage of steam past the abutment into the open piston.

On opposite sides in the heads of the cylinder two sets of ports are most ingeniously arranged. The valve



JARVIS' IMPROVED ROTARY ENGINE.

shaft of each set of ports and that of the main steam inlet port are provided at their extremities with gear wheels which mesh with a central gear wheel mounted on the outside of the cylinder, as shown in the upper engraving. To the main steam inlet valve a handle is secured which, upon being turned, causes the gear wheels to act simultaneously upon their valves, and enables the engineer to place either set of ports in connection with the main steam inlet port. An easy method of reversing the engine is thus provided; for, by merely turning the handle from left to right or from right to left, as the occasion may require, the engineer can disconnect the acting set of ports from the main steam inlet port and place the latter in register with the other set of ports, causing the piston to revolve in the opposite direction.

The engine is either simple or compound, using as many low pressure cylinders as the steam pressure justifies. At the instant the steam begins doing expansive work in a low pressure cylinder it has the advantage of the greatest mechanical leverage and the greatest piston head area to work against, while its pressure is at its highest point in the particular low pressure cylinder in which it is doing work. The engine is easily reversible and runs equally well in either direction. It is simple, compact, of durable construction and easy of access; all parts of it being adjustable from the exterior. All lost motion in the bearings and steam packing is taken up automatically, if need be, by means of caps upon cones, and wedges upon plain surfaces. These adjustments it is claimed keep the engine absolutely steam-tight and also serve to distribute all strains and wear equally throughout the engine. They also keep the engine in line. Another feature of these adjustments is the fact that nearly all the wear is taken up by them, so that when worn out they may be replaced by new ones, thereby making the engine very lasting. The inlet and exhaust ports can be made very large without materially affecting the efficiency of the engine, making one of the simple type a very high speed engine. An engine of the compound type can be geared to the transmitting journal, bevel or pulley for either speed or power. The engine is easily lubricated by any modern method, has direct connecting facilities and has no working valves. Having a continual flow of steam it is easily governed and could be made to do automatic expansive work. It can be provided with auxiliary ports and valves whereby any or all the low pressure engines can be made to do high pressure work at any time. Owing to the construction of the engine, the steam can be easily and comparatively inexpensively superheated while exhausting from a higher to a lower pressure cylinder, by specially devised means for that purpose.

Roman Fever.

The superstition that Rome is an unhealthy place to live in is discussed by Mr. W. J. Stillman, in "Old Rome and the New." Mr. Stillman has lived in Rome so many years that his judgment on this subject may be accepted as of great value. He states that the superstition as to the sanitary condition of Rome runs back into the dark ages, but is unjustified by any statistics. He says that in a residence of nearly a dozen years in the aggregate and extending over a period of thirty years, he has never had a single serious illness or a case of typhoid or malaria in his family, nor among his acquaintances has he ever known one-half dozen cases of intermittent or malarial fever and not one of any gravity. He has repeatedly stayed in Rome during the entire summer without any discomfort or inconvenience. He has never met with a case of so-called "pernicious" fever, and Dr. Drummond, who has practiced in Rome for years, says he never saw a case. The statistics of the Italian Sanitary Department are drawn up with the greatest care and exactitude, and the record of deaths from malarial fevers for the commune of Rome, including the Campagna and all of the malarial districts, only shows a total of 308 out of a population of 500,000, and this enumeration includes peasants who spend their lives in the marshy and fever-infected districts. Mr. Stillman says he has traveled in the worst parts of Maremme, which are regarded as most deadly and malarial in Italy, as late as the latter part of June, and he found the harvesters at works in gangs; and at Grosseto, the capital of Maremme, which the guide books tell us is abandoned by the inhabitants on the first of May, he found the entire population on the ramparts listening to the band until late in the evening.

Typhoid is common in great cities, but in Rome less so than in most of the cities of its size. The water supply of Rome is probably the best as to its purity and the most abundant in quantity of any furnished to great cities. Typhoid very rarely occurs among the inhabitants of the better class, except from drinking water at some wayside spring. The sanitary laws are inflexible, and the tenant of a neglected house has always the remedy in his own hands. Mr. Stillman says: "I have no hesitation in saying a person in moderate circumstances, able to choose his quarters, can pass the months between September and July in Rome under as favorable conditions of health and comfort as in any city in Europe; and with less precautions against the heat than in New York one must take against the cold, he may pass the entire year."

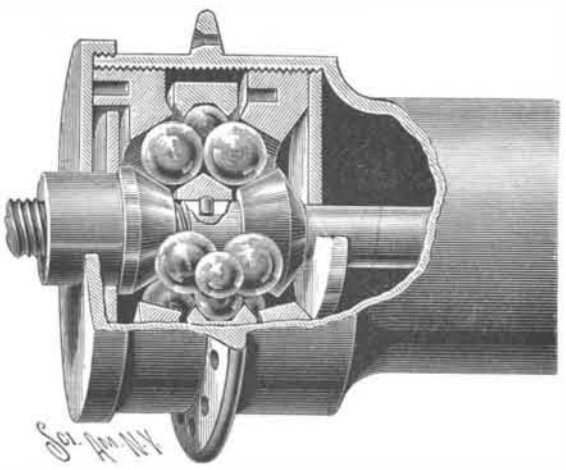
Fraudulent Mining Schemes.

Promoters of Alaska transportation and mining schemes, says The Mining and Scientific Press, seem to figure on even more than ordinary gullibility on the part of the general public. Some of the offers and inducements are more barefaced than those of 1897. As usual, some of the British schemes are worse swindles than those concocted in this country, which is saying a good deal. In London papers are now being published prospectuses beside which the recent ridiculous romance in the London press, the "prospectus" of a company proposing to operate mines in Plumas County, Cal., reads like sober truth. This latter concern styles itself "a parent company;" with £125,000 capital, and proposes to do anything and everything in the Klondike region, from supplying "reindeer tanned skin coats with fur sleeves" to "town sites, water lots" and bonanza placer claims on Bowlder Creek. Little matters like sawmills, trading stores and railway franchises are scattered in merely as seasoning. Any one buying five hundred shares and making certain promises will be carried free from England to the Klondike and return, and paid £200 per year for two years. The usual array of big names head the list of "directors."

THE 17th of May will be the four hundredth anniversary of the arrival of Vasco de Gama at Calicut, East India, after accomplishing the first circumnavigation of Africa.

A NEW BALL BEARING.

In the ball bearing shown in the accompanying illustration and patented by Ole Lunde, of Elgin, Illinois, two or more circular series of bearing balls and an intermediate series of separating balls are employed. It will be seen that a very novel arrangement of inner cone-bearing surfaces is provided. These bearing surfaces are formed by two collars on the axle, one adjustable toward the other, and an intermediate ring. This ring has a pin which projects into a recess or groove in



LUNDE'S BALL BEARING.

the axle, whereby the ring is free to slide longitudinally along the axle, but is made to rotate with the axle. By this arrangement it is evident that the ring will adjust itself and take a proper position between the two rows of balls. The exterior bearing surfaces are provided by two bearings adjustably fitted in the hub and spaced to receive a ring which embraces the central series of separating balls, the ring having a groove with inclined sides to receive the balls, and the bearings having surfaces oppositely inclined to the surfaces on the axle collars. The automatic adjustment of the sliding bearing ring on the axle and the series of separating balls are designed to prevent sliding friction and grinding and to distribute the load evenly on the two series of bearing balls.

A COMBINED BOTTLE AND MEASURING DEVICE.

We present herewith two views of a novel bottle which has been patented by Lewis K. Larrison, of Schooley's Mountain, New Jersey. The purpose of the invention is to combine with a bottle, a vial or smaller vessel into which liquid can be poured without removing the stopper and exposing the liquid to the contaminating action of the air. Two lateral members connect the vial with the bottle, the lower member being solid and the upper having two passages. One of these passages supplies liquid to the vial, the other permits the escape of air from the vial to the bottle. The stopper of the vial is of the usual shape. The stopper of the bottle is cut away or formed with a recess at one side as shown, and when its plain side is presented to the passages it will close the latter and cut off communication between the bottle and vial, but when the stopper is given a partial turn to present its recess to the passages, liquid from the bottle may freely pass into the vial. Thus the stopper forms a valve which controls the passages. When a sufficient amount of liquid

LARRISON'S BOTTLE.

has been collected in the vial and the bottle stopper turned to close the passage-ways, the vial stopper may be removed and the liquid poured off. The vial is preferably graduated according to any system of measurement, enabling the exact quantity which enters from the bottle to be accurately determined. A bottle constructed after this method would be very convenient in the administration of medicine, since a dose could be accurately measured in the vial and the medicine directly drunk therefrom without the aid of a spoon.