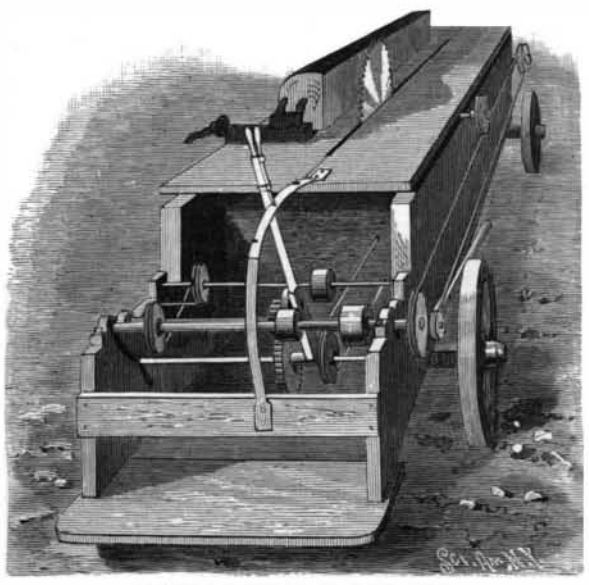
A PORTABLE SAWMILL.

The illustration represents a sawmill in the form of a wagon, which may be conveniently moved from place to place for sawing logs into lumber, railway ties, etc., near where the trees are felled. The improvement has been patented by H. A. Sager, 64 East Park Street, Butte, Montana. The sawmill bed has longitudinal guideways in which a carriage moves forward and backward, the saw arbor being journaled in the carriage,

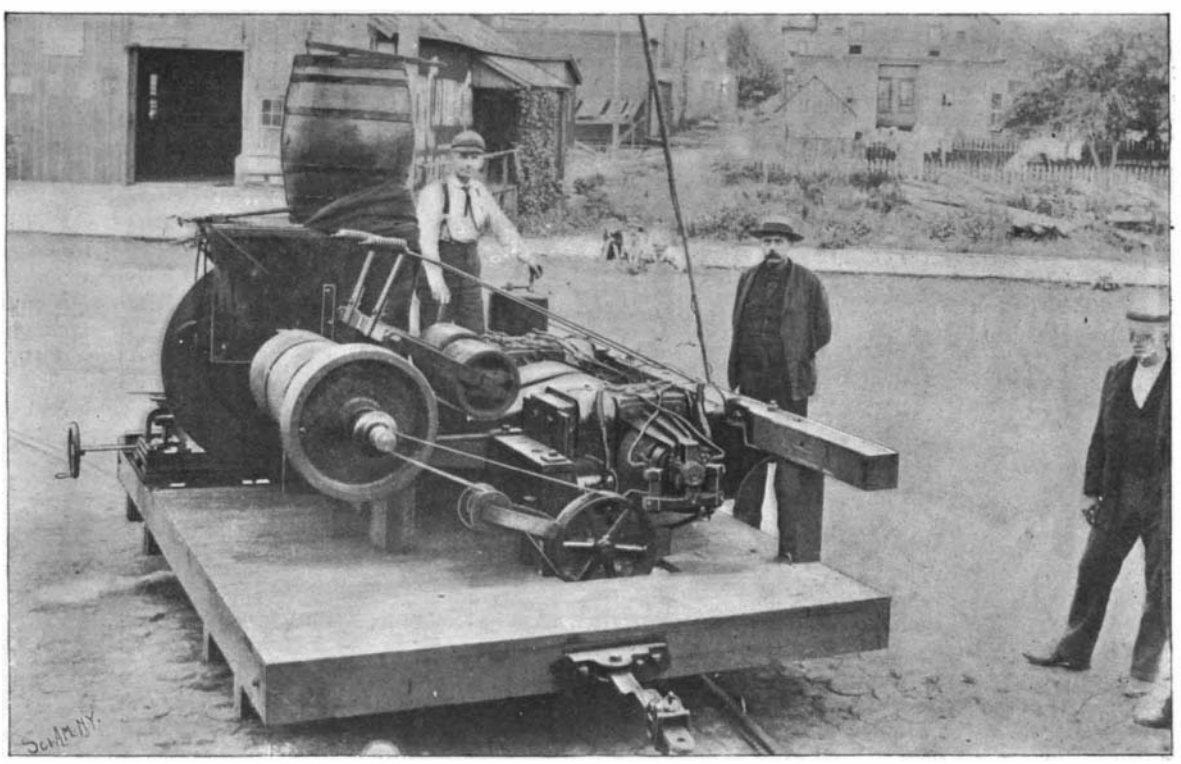


SAGER'S PORTABLE SAWMILL.

and the circular saw extending up through a slot in the table forming part of the bed. The saw is rotated and a forward and backward motion given to the carriage from a main driving shaft, connected with a source of power, and located at the rear of the wagon body. On one end of this shaft is a grooved pulley, over which passes a rope belt extending along one side of the bed and over a second grooved pulley at its forward end, one of the runs of the belt also passing once around a pulley on the outer end of the saw arbor, whereby the saw is rotated. The carriage is moved by a rope belt connected with it and extending over pulleys at the front and rear of the bed, the forward and backward motion being effected through a gearing on the shaft of the rear pulley, the gearing being in mesh with a pinion on a short shaft journaled in a hand lever. The short shaft also has a friction pulley adapted to engage either of two friction pulleys, one of which is on a shaft carrying a cross belt, so that, according to the position of the hand lever, the carriage will be caused to travel either backward or forward. The hand lever is guided on and adapted to be locked to a toothed segment. In order to tighten the saw-driving belt, a tightening pulley is secured on a lever fulcrumed at the side of the wagon.

PORTABLE ELECTRIC RAIL SAWING MACHINE.

We have been favored by Mr. G. S. Johnson, general manager of the Consolidated Street Railway Company, of Grand Rapids, Mich., with a photograph of an electric saw, which is used to cut off the battered ends of rails so that they can be relaid, thus obviating the purchase of new rails. The car holding the machine is 12 feet in length by 8 feet wide. The car is equipped with two Rae motors of 30 horse power each, the current being obtained from a trolley pole. The motors are belted to the saw shaft, and an idler pulley keeps the belts tight. The saw, which is a smooth steel disk, is 42 inches in diameter, make 1,800 revolutions per minute, and is supplied with water from a barrel by means of small jets. Arrangements are provided for feeding the rail to the saw. In operation this machine has been found to be very efficient and economical, sawing off the end of a 66½ pound girder rail in one minute. The total cost of sawing rails is $1.50 per ton, which includes the handling of the rails.



PORTABLE ELECTRIC RAIL SAWING MACHINE.

THE man who studies a single subject until he loses sight of everything else is always in danger of parting with his judgment. When he does that, when he is entirely wrapped in a single idea, he almost inevitably develops what unspecialized people call crankiness.

An Expedition to Discover How Coral Islands Grow.

BY E. W. RICHARDSON, IN KNOWLEDGE.

Fifteen years ago Darwin, finding surface investigation and dredging insufficient to determine with certainty the origin and genesis of coral atolls, expressed in a letter to Alexander Agassiz the wish that some rich man would have borings made in some of the Pacific and Indian atolls, and bring home cores from a depth of five hundred or six hundred feet for examination. For nine years this idea lay dormant in the minds of scientific men, but six years ago it took shape, and a committee of leading geologists and biologists was formed by the British Association to carry it out. Prof. Bonney was appointed chairman and Prof. Sollas secretary to this committee. The British Association appealed to the Royal Society, which readily supported the scheme. A large sum was voted from the Government Grant Committee, and another by the Royal Society from its own funds. Prof. Anderson Stuart, of Sydney, N.S.W., has given great help, and it was through his efforts that the Colonial government was induced to lend drill and steam plant to the value of two thousand five hundred pounds. The New South Wales government also supplied skilled workmen, and contributes toward the wages of those in charge of the machinery.

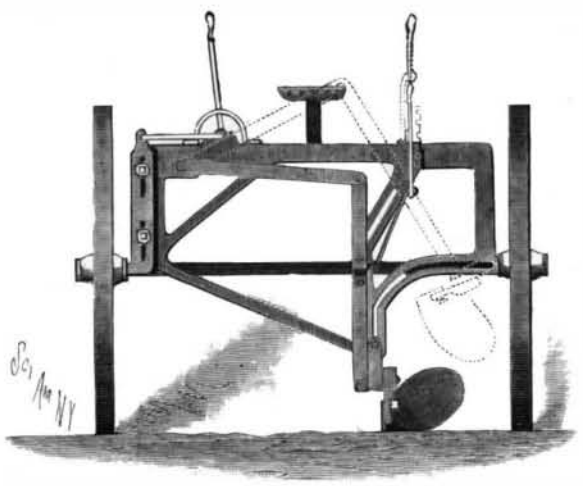
After some five years' preliminary preparation and hard organizing work, an expedition to carry out Darwin's wish, and to discover by boring the origin of a coral atoll, was formed. The expedition is in charge of Prof. Sollas, who is well known as having devoted special attention to coral formations. The other members of the expedition are Mr. John Stanley Gardner, B.A., whose work as a biologist is considered of great promise, and Mr. Charles Hedley, of the Australian Museum, who, besides being a naturalist, is an artist, and will make all the drawings and sketches for the expedition.

The government have placed H.M.S. Penguin at the disposal of the expedition, for the purpose of carrying the personnel and plant from Sydney to the scene of operations and back. The Penguin started on May 1, and next month will probably be bringing the members of the expedition back. The island chosen for investigation is Funafuti, the largest isle of the atoll of that name, which forms one of the group of the Ellice Islands. These coral isles are situated in a latitude 9° south, longitude 180°, and almost due north of Fiji. Funafuti is a typical atoll, being a chain of thirty-five islets encircling a large central lagoon about ten miles long by five wide. The chief island—and that on which the expedition is located—is about four miles long by half a mile wide, and it is nowhere higher than from eight to nine feet above the sea level. The island, which is under British protection, is covered with cocoanut trees, and supports a peaceful population of four hundred natives, nominally Christian.

Prof. Sollas' instructions are simplicity itself; he is "to investigate a coral reef by sounding and boring," and is to do so with a mind quite unbiased as to the various rival theories of coral reef formation. The drill which does the boring is faced with black diamonds, which will cut through anything. The diameter of the drill is four inches. Seeing that the coral polyp has never been recorded as living at a greater depth than ninety feet, it will only be necessary to bore to a depth of six hundred feet, and if that depth be reached, the chief object of the expedition will have been attained. At the same time it is an open secret that Prof. Sollas intends to go as far down as one thousand feet, if possible, and thus solve beyond a doubt the point to be cleared up.

AN IMPROVED PLOW.

The accompanying illustration represents an improvement whereby, when the plow beam is elevated, it will be turned in a manner to invert the plowshare, as shown in dotted lines, thereby spilling adhering material, the plow being seen looking from the rear. The improvement has been patented by Henry J. Wildhagen, Palatine, Ill. The wheel on one side is made adjustable with the plow frame, and controlled by a



WILDHAGEN'S PLOW.

lever, in order to facilitate work on slanting ground or on a hillside, also permitting one of the wheels to travel in a furrow while the other is on the surface of the ground, the plow making furrows of uniform depth.

There are two angular guideways at the other side of the frame, and the outer one of two pivotally connected links has a pin which moves in the upper one of the two guideways, the end of this link being pivotally connected with one member of an angle arm pivoted on the inner side of the plow beam, the other member of this arm having a guide pin which travels in the lower guideway. A rod pivotally connected with the pin moving in the upper guideway is attached to a shifting lever fulcrumed on the upper portion of the frame, this lever having a locking device engaging a rack, and when the lever is carried to an upper position, as shown in dotted lines, the plow beam is gradually raised and turned until its land side is in an upper and its mouldboard in a lower position. By this turning of the plowshare when the beam is raised the share is kept clean, and the plow may be taken from one place to another without the plowshare touching the ground.

The Utility of Inventions.

It is, no doubt, true that when a new invention is introduced which revolutionizes some particular art or branch of business, it at first decreases the number of persons employed in that particular line; but that is only temporary, for in a short time the result is a cheapening of the product, a greatly increased demand for it, because of this cheapening, and then necessarily an increased demand for laborers in that line, and almost universally at increased wages. The statistics show this to be true beyond the possibility of a question. The records of the labor bureau of the United States show that from 1860 to 1880, the most prolific period of inventions, and the most intensified in all directions of their introduction, the population increased 59·51 per cent, while in the same period the number of persons employed in all occupations—manufacturing, agriculture, domestic service and everything—increased 109·87 per cent; and in the decade from 1870 to 1880 the population increased 30·08 per cent, while the number of persons employed increased 30 per cent. As shown by the investigation of a committee of the United States Senate, wages have increased 61 per cent in the United States since 1860. And, as we all know, during that same period the cost to the people of nearly all manufactured articles has been decreased in as great if not a greater ratio.—Canadian Journal of Fabrics.