a new accelerating device in form of an accelerating piston. Steam or air is conducted into the internal cylinder of the main piston through a small port in the accelerating piston, and is held against escape by a check valve. Entering on the downward stroke, it is highly compressed on the upward stroke. By this means not only is acceleration attained, but a positive cushion is provided.

GOLD ON VANCOUVER ISLAND

In his recently-issued Memoir on South Vancouver Island, published by the Geological Survey of Canada, Mr. Charles H. Clapp, of that department, who began a geological examination in 1908 and continued it the following years, under the head of Economic Geology says that there are in southern Vancouver Island mineral deposits valuable, or possibly valuable, for gold, copper, iron, fluxes and pigment; also important structural materials including lime, and cement, clay, sand and gravel, and stone. Concerning gold, Mr. Clapp reports:

Placer-Gold Deposits.—Placer-gold deposits are the chief source of gold in southern Vancouver Island, and the only source which has here produced gold in paying quantity. Gold is reported from a large number of rivers and creeks on southern Vancouver Island, and "colours" can doubtless be obtained by panning in most of the streams. With two or three exceptions, the principal deposits all occur, however, in the streams which flow for a considerable part of their course over the Leech River formation. The gravels and sands near the mouth of Sombrio River have been known as a source of gold since the Spaniards explored the Pacific coast in the latter part of the eighteenth century. In the sixties the deposits in the Leech and Jordan rivers were discovered and worked the yield being estimated at between $100,000 and $200,000; and, somewhat later, coarse gold was found in the upper part of the San Juan River. For a number of years Chinamen have worked on Leech River, and one or two more extensive attempts have been made recently to obtain gold from Leech River and its north fork. At present, a partnership has been formed to work a large deposit of sand and gravel near the mouth of Sombrio River. Beside these deposits, which occur in the belt of the Leech River slates, small amounts of gold have been obtained from China Creek and Franklin River, emptying into Alberni Canal, and also from Nanaimo River.

Virtually all of the streams which occur in the belt underlain by the Leech River slates contain more or less coarse gold. With the exception of the two large valleys which occur along the northern and southern boundaries of the formation, the San Juan valley, and the valley which has been called Leech River valley (but which is occupied by several streams beside Leech River, notably Jordan River and its tributaries Bear Creek and Y Creek, and Lost River), the valleys are narrow and the grade steep. The amount of gravel in these streams is, therefore, small. It is very possible that relatively large amounts of auriferous gravel may be found on the wide, comparatively smooth, interstream areas. These interstream areas are, as a rule, drift-covered and heavily timbered, so that prospecting is carried on with considerable difficulty.

The amount of gravel, even in the Leech River valley, is not large throughout the greater part of its extent, but special conditions have existed in certain portions, which have caused its accumulation in large amounts. The conditions are not at present well understood. The largest known deposit occurs in the lower part of the valley, extending to the coast near the mouth of Sombrio River. Lost River, which occupies the western part of the Leech River valley, does not cross these gravels, but turns abruptly to the south more than a mile from the shore, and finds its way to the sea through a narrow canyon. The gravels are underlain by Tertiary conglomerate and sandstone, which are exposed at the shore and at the bend of Lost River at 320 ft. above sea-level. Near sea-level the Tertiary rocks are directly overlain by a sandy clay of indefinite thickness, but probably not more than 10 or 15 ft., which contains marine Pleistocene fossils. The overlying sand and gravel is from 300 to 500 ft. thick, and the deposit is one-quarter to one-half mile wide, and extends inland beyond the bend of Lost River, for a distance reputed to be more than two miles. On top of the gravels is a yellow garnet-bearing sand, 10 to 20 ft. thick, occurring at elevations of from 450 to 500 ft. above sea-level, although near the shore it occurs much lower, probably on account of local slips in the deposit. The sand consists largely of rounded quartz grains, and resembles a beach sand. Mr. R. S. Gallop, one of the partners who own the deposit, in a recent letter to Mr. Clapp, states that the mining engineers who have examined the deposit estimate the amount of gravel at 155,000,000 cubic yards, and th gold content at 12 cents a yard.

The orgin of the gravels is not at present clear. A large part of the gravel contains pebbles of many different rocks, and appears from its heterogeneous character to be composed of glacial detritus. It seems probable therefore, that the gravel was deposited by a large, post-Glacial river flowing westward in the Leech River valley before the recent uplift. This uplift diverted the river into its present course, that of the Lost River. The gold, if deposited under these conditions, was probably derived from a much larger quantity of glacial gravels.

A large amount of gravel occurs also in San Juan valley, but is probably low grade, as it is chiefly of glacial origin, and any gold that it contains does not appear to have been especially concentrated, except very locally.

The gold in the above-mentioned gravel deposits has doubtless been derived from the quartz veins which occur in the Leech River slates. These quartz veins, or more correctly small stringers and lenses, are very numerous, but they seldom attain any great size. The quarts of the veins is associated with a little albite, which in the sheared veins has altered to sericite. The only metallic minerals are a little pyrite or chalcopyrite, and free gold. The veins are, as far as known, very low grade, and are too small and barren to be profitably mined, and all attempts which have been made to work the veins have been unsuccessful.

The only development of the gold deposits of the Leech River belt going on at the present time is that of the large deposit of sand and gravel occurring along the west coast, near the mouth of Sombrio River. Messrs. R. S. Gallop, D. W. Hanbury, and W. H. Kirkbride have nearly finished the construction of a