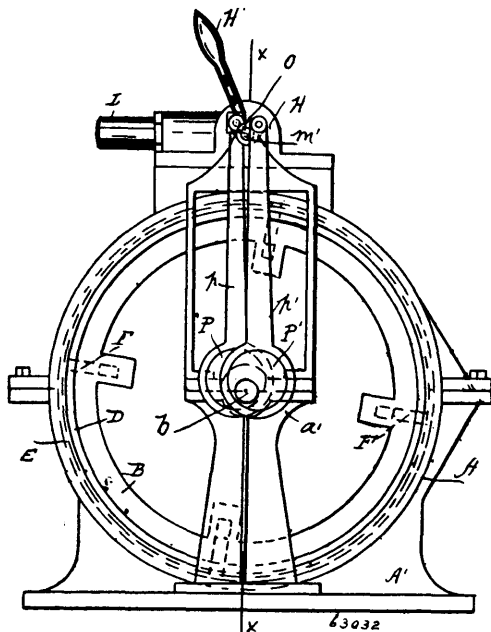


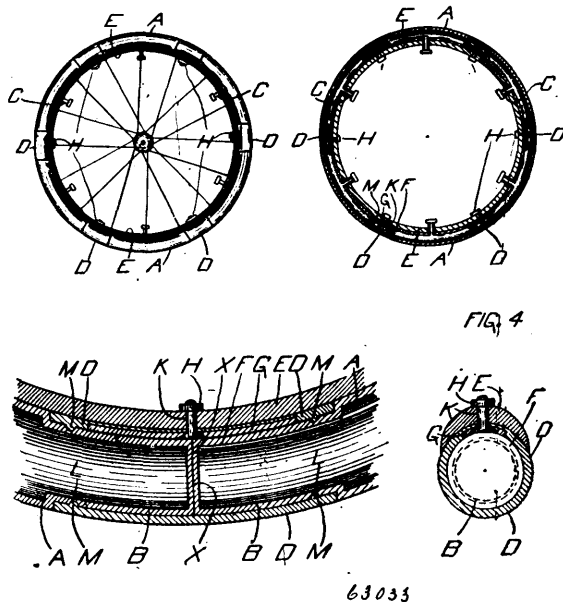
plates being slidable in the said grooves respectively, a series of piston plates arranged out of line with each other one in each groove



of the piston, and a valve operating to admit steam to the grooves of the piston between each pair of slidable plates one after the other, substantially as set forth. 2nd. In a rotary engine, the combination, with a cylinder provided with a series of pairs of steam and exhaust ports, of a piston journaled in the cylinder and provided with a series of circumferential grooves communicating with the said pairs of ports, a series of slidable abutment plates arranged in line with each other and carried by the cylinder between the said pair of ports, said abutment plates being slidable in the said grooves respectively, a series of piston plates arranged out of line with each other one in each groove of the piston, and a valve operating to admit steam through the said steam ports to the said grooves between each pair of slidable plates one after the other, substantially as set forth. 3rd. In a rotary engine, the combination, with a cylinder, a piston journaled in the cylinder and having a series of circumferential grooves each provided with a slidable piston plate, and slidable abutment plates carried by the cylinder, each said abutment plate being slidable in a separate groove of the said series, of a rotary valve controlling the admission and exhaust of steam to and from said grooves, and driving mechanism operating to move the said valve in one direction continuously, substantially as set forth. 4th. In a rotary engine, the combination, with a cylinder, and a piston journaled therein and provided with circumferential ribs, said ribs and cylinder having meeting semi-circular grooves, of packing rings formed of rifted tubes and operating to keep the said ribs steam-tight, substantially as set forth. 5th. In a rotary engine, the combination, with a cylinder, and a piston journaled therein and provided with circumferential ribs, said ribs and cylinder having meeting semi-circular grooves, of packing rings formed of rifted tubes, and means for admitting steam to the interior of the said packing rings, substantially as set forth. 6th. In a rotary engine, the combination, with a cylinder, and a piston journaled therein, of a rigid flange secured to one of the said parts, and a ring secured to the other said part and provided with a spring flange free to bend laterally and having a lip bearing against the said rigid flange and forming a steam-tight joint, substantially as set forth. 7th. In a rotary engine, the combination, with a cylinder, and a piston journaled therein, said parts having meeting semi-circular circumferential grooves, of a packing-ring formed of a tube of resilient material provided with a circumferential rift or split and arranged in the said grooves, substantially as set forth. 8th. In a rotary engine, the combination, with a cylinder, and a piston journaled in the cylinder and provided with a circumferential groove, of a radially slidable piston plate carried by the said piston, a radially slidable abutment plate carried by the said cylinder, and wedges secured to the said piston and cylinder on each side of each of the said plates and extending one-half the depth of the said groove, substantially as set forth. 9th. In a rotary engine, the combination, with a cylinder, and piston journaled in the cylinder and provided with a circumferential groove, of a plate carried by one of the said parts and slidable crosswise of the said groove, and curved wedges secured one on each side of the said plate and provided with longitudinal grooves in their faces preventing the formation of compression and suction chambers, substantially as set forth. 10th. In a rotary engine, the combination, with a cylinder, of an abutment plate slidable in a socket in the cylinder and provided with recesses 8 at its upper edges, vertical

grooves 7, in its side edges, and cross grooves 16 in the middle parts of its side edges, packing plates 9, slidable in the recesses 8, and provided with grooves 11, and packing strips 14 slidable in the grooves 7 and 11, and provided with projections 15, engaging with the grooves 16, substantially as set forth. 11th. In a rotary engine, the combination, with a cylinder, of an abutment plate slidable in a socket in the cylinder and provided with a groove 4, in its lower edge, and vertical grooves 7, and cross grooves 16, in its side edges, a flanged packing strip 2, slidable in the groove 4, and provided with grooves 5 in its ends, and packing strips 14 slidable laterally in the grooves 7 and 5, and provided with projections 15, engaging with the grooves 16, said projections 15 preventing the packing-strips from sliding vertically in their grooves, substantially as set forth. 12th. In a rotary engine, the combination, with a cylinder, and a valve casing provided with a series of pairs of ports  $j, j'$ , and two exhaust ports  $k, k'$ , arranged crosswise of the cylinder, of an oscillatory reversing valve journaled in the said casing and provided with a series of steam passages  $i$ , arranged in line with each other, and two exhaust cavities  $i'$ , arranged one on each side of the said steam passages, and a rotary steam distributing valve consisting of a hollow cylinder journaled in the reversing valve and provided with a series of steam-ports  $n$ , arranged out of line with each other in its periphery and communicating with the said passages  $i$ , respectively and one after another, substantially as set forth. 13th. In a rotary engine, the combination, with a cylinder, and a valve casing provided with a series of pairs of ports  $j, j'$ , and two exhaust ports  $k, k'$ , arranged crosswise of the cylinder one on each side of the ports  $j, j'$ , and passages  $K$  arranged between the pairs of ports  $j, j'$ , and connecting the passages  $J, J'$ , of an oscillatory reversing valve journaled in the said casing and provided with a series of steam passages  $i$ , arranged in line with each other, and two exhaust cavities  $i'$ , arranged one on each side of the said steam passages, and a rotary steam distributing valve consisting of a hollow cylinder journaled in the reversing valve and provided with steam-ports  $n$ , arranged out of line with each other in its periphery, substantially as set forth. 14th. In a rotary engine, the combination, with a valve casing provided with steam and exhaust ports, of a reversing valve journaled in the casing and provided with an end portion  $h$ , forming a steam tight seat against the casing, and a stem projecting through the end of the casing, a hollow steam distributing valve journaled in the said reversing valve and provided with an end portion  $m$ , forming a steam-tight seat against the reversing valve, and a stem projecting through the aforesaid stem, and a steam pipe connected to the casing at the other ends of the said valves from their stems and admitting steam to the interior of the said distributing valve, substantially as set forth. 15th. In a rotary engine, the combination with a rotary steam distributing valve, and a double crank secured to the said valve, of two eccentrics driven by the engine shaft, and two eccentric rods operatively connected with the arms of said double crank, whereby the said valve is driven continuously and in the same direction as the said engine shaft, substantially as set forth.

#### No. 63,033. Bicycle Tire. (*Bandage de bicycles.*)



George H. Ricke, Alexander Reid and John H. Woodward, all of Cincinnati, U.S.A., 8th May, 1899; 6 years. (Filed 14th October, 1898.)

*Claim.*—1st. In a bicycle tire a pneumatic tube made of sections, the ends of the sections being offset and depressed, in combination