

in the described chambered valve-chest and co-operating with the piston, to distribute steam to both ends of the cylinder, all constructed and arranged to operate as and for the purpose specified. 3rd. In a steam rock-drill or analogous machine, the cylinder, the elongated circumferentially grooved steam-moved valve in the described valve-chest, and the steam passages or ports located relatively to each other and to the piston, and valve, as described, whereby while said valve operates to control the distribution of steam to the ends of the cylinder, the piston operates directly as a cut-off to the inlet ports, as specified. 4th. The combination, in a steam rock-drill or analogous machine, of the cylinder A, the elongated circumferentially grooved piston B, valve-chest F, single valve G, the steam inlet port I, and the exhaust passage J, which serves both as an induction and eduction port for the lower end of the cylinder, substantially as and for the purpose specified. 5th. In a steam rock-drill or other analogous machine, the combination of the cylinder A, elongated circumferentially grooved piston B, single valve G, valve-chest F, and the steam inlet port E, controlled directly by the said piston and communicating between the steam chest E, formed by the circumferential groove in the piston, and the lower end of the said valve-chest from the said steam-chest in the cylinder, as and for the purpose described. 6th. In a steam rock drill or other analogous machine, the combination of the cylinder A, elongated circumferentially grooved piston B, valve-chest F, with the steam passage A, opening at one end into the upper end of the valve-chest and at the other end into the cylinder, whereby steam is introduced from the steam-chest in the piston, both into the upper end of the cylinder and the upper end of the valve-chest, substantially as and for the purpose described. 7th. The cylinder, provided with the longitudinal groove E<sup>2</sup>, and the supply pipe E<sup>1</sup> communicating therewith, and the elongated piston provided with the circumferential groove, forming a steam-chest in the cylinder, communicating with said groove E<sup>2</sup>, as and for the purpose described. 8th. In a steam rock-drill, or analogous machine, the cylinder, the elongated circumferentially grooved piston and the described means for distributing the steam to the cylinder, the combination, with the piston, of an inlet-passage to conduct steam from the circumferential chamber in the piston to be distributed to the upper end of the cylinder, said passage being governed by the piston, and located relatively thereto, as described, so that the piston in its upward stroke closes said passage before reaching its termination, whereby the steam is used expansively during a portion of the upward stroke, as specified. 9th. In combination with a steam moved valve, means for introducing live steam into one end of the valve-chest, while the other end of the valve-chest is in communication with the end of the main cylinder containing expanded steam, whereby the valve is moved by the excess of the pressure of live steam acting upon one end of it, over the pressure of expanded steam acting upon the other end of it. 10th. In a steam rock-drill, or other analogous machine the cylinder and piston, the passages for distributing steam to the cylinder and the valve governing said passages, together with the exhaust port leading from the upper end of the cylinder and governed by the piston and located relatively thereto, as described, so that the residual steam remaining in the upper end of the cylinder, after the exhaust is confined therein, and retained while the piston makes its upward stroke, and until on its return-stroke the exhaust is again opened, whereby the steam in its compression assists in propelling the piston in its downward stroke, as described. 11th. In a steam rock-drill, or other analogous machine, in which the length of the working-stroke is subject to variation, the combination, with the main piston and a valve governing the inlet-port to the lower end of the cylinder, of a passage for the transmission of steam, whereby said valve is actuated, said passage being constructed as and for the purpose described, and an inlet passage to the upper end of the cylinder, arranged so that it is closed before the piston reaches the limit of its downward stroke, as described. 12th. In a steam rock-drill, or other analogous machine, in which the length of the working-stroke of the piston is subject to variation, the combination, with the main piston, the inlet passages to the cylinder leading from the valve-chest, and the valve governing said passages, of the port E leading to the valve-chest governed by the piston and located relatively thereto, as described, so that it is opened when the piston in its downward stroke reaches the point of limit of the shortest practical working-stroke, which in practice it is intended to be permitted to make, and the inlet-port A<sup>2</sup> for conducting steam to the upper end of the cylinder which actuates the piston in its downward stroke, whereby the steam is used expansively during a portion of said stroke, all constructed and arranged to operate as and for the purpose specified. 13th. In a steam rock-drill, or analogous machine in which the length of its working strokes is liable to variation, the combination, with a steam-moved valve governing the inlet-port to the lower end of the cylinder, of a passage communicating with the valve-chest for the transmission of steam, by the agency of which the valve is shifted to introduce steam to the lower end of the cylinder, said passage being suitably constructed, as described, to so limit the transmission of steam that between the commencement of the movement through it of the steam whereby the valve is shifted, and the actual shifting of the valve, there shall necessarily occur a determinate delay in which the piston may move beyond the point of the shortest working stroke which in practice it is intended to be permitted to make, and make its longer strokes, as described, by the time steam is introduced into the lower end of the cylinder, as and for the purpose specified. 14th. The method of decreasing the steam-cushioning in the working-stroke of the piston of a rock-drill or other analogous machine, liable to make strokes of variable length, which consists in the application, at the time the piston reaches its shortest practical stroke, of a gradually increased steam-pressure to the steam-moved valve governing the inlet-port to the lower end of the cylinder, whereby between the beginning of said pressure and the shifting by it of the said valve there will necessarily occur a determinate delay, as and for the purpose specified. 15th. In a steam rock-drill, or other analogous machine, wherein the piston is liable to make strokes of variable length, the combination, with the piston and a steam-moved valve governing the inlet-port to the lower end of the cylinder, of an exhaust passage from the upper end of the valve-chest, and an inlet-passage to the lower end of the valve-chest, said inlet-passage being constructed, as de-

cribed, for the the purpose of compelling the gradual admission of steam to the valve-chest, whereby there shall necessarily occur a determinate delay between the commencement of the transmission of steam through said inlet-passage to shift the valve to admit steam to the lower end of the cylinder, and the actual shifting of the valve, as and for the purpose described. 16th. In a steam rock-drill, or other analogous machine, wherein the piston is liable to make strokes of variable length, the combination, with the piston and a steam-moved valve governing the inlet port to the lower end of the valve-chest, the said exhaust-passage being constructed, as described, for the purpose of compelling the gradual exhausting of the steam from said upper end of the valve-chest, whereby there will necessarily occur a determinate delay between the opening of said exhaust passage and the shifting of the valve, as and for the purpose described. 17th. In a steam rock-drill, or other analogous machine, wherein the piston is liable to make strokes of variable length, the combination, with the piston and a steam-moved valve governing the inlet-port to the lower end of the cylinder, of the inlet-passage to the lower end of the valve-chest, both being suitably constructed to conjointly retard the action of the steam to shift the valve, whereby there shall necessarily occur a determinate delay between the commencement of the movement through said passage of the steam to shift the valve to admit steam to the lower end of the cylinder, and the actual shifting of said valve, as and for the purpose described. 18th. In a steam rock-drill, or other analogous machine, the steam-moved valve governing the distribution of steam to the cylinder, and the inlet and exhaust passages to and from said valve, one of said passages, either the inlet or exhaust at one end of the valve chest, being constructed, as described, relatively to the corresponding passage at the other end of said chest, whereby the valve has a slow motion in one direction and a quick motion in the opposite direction, as and for the purpose described. 19th. In a steam rock-drill comprising the main cylinder and piston, the steam-moved valve, the described passages for distributing steam to the cylinder and valve-chest and exhausting steam therefrom, the combination with the piston governing the exhaust-ports from the valve-chest, and the steam-moved valve governing the inlet-port to the lower end of the cylinder, of the inlet passages to the valve-chest that establish open communication between the ends of the valve-chest and the live steam supply, the said inlet passage leading to the lower end of the valve-chest being of comparatively small cross-area or conducting capacity, whereby there necessarily occurs a determinate delay between the opening of the exhaust at the upper end of the valve-chest and the shifting of the valve to open the inlet-port to the lower end of the cylinder in which the piston may move from the point of the shortest working-stroke, which in practice it is intended to be permitted to make, to the termination of its longer strokes, by the time the steam is admitted to the lower end of the cylinder.

#### No. 21,351. Fence. (*Clôture.*)

Christian Hanika, Springfield, Ohio, U.S., 1st April, 1885: 5 years.

*Claim.*—1st. The combination, with a fence picket and supporting rail or rails, of one or more ornaments or connecting links adapted to encircle said picket, and being provided with hook-shaped projections to hook over and under the supporting rail, said hooks being central with relation to the central longitudinal line of the picket, said hooks thereby forming a pivotal connection between the picket and rail, and allowing them to be adjusted at an angle with relation to each other, substantially as and for the purpose described. 2nd. The combination, in a fence provided with wooden pickets, iron supporting-rails and connecting links or ornaments, as described, of a locking-plate provided with a screw or spike-shaped projection, adapted to be screwed or driven into the picket, said locking-plate being provided with arms or lugs adapted to engage with the picket holding links, substantially as and for the purpose set forth. 3rd. The combination, in a fence having wooden pickets and iron or metallic supporting-rails, of ornamental links adapted to encircle said pickets and hook over and under the said rail, and a locking-plate adapted to be driven into the picket between the said connecting links, and being provided with arms or lugs to engage the said links, and a central projection to prevent the links being accidentally displaced, substantially as described. 4th. The combination, with the fence picket and supporting-rail, of two coupling links adjacent to one another at lines above and below the supporting-rail, said links being provided with loops at one end adapted to encircle the picket and having projecting hooked arms extending out in a line with the center of said loops, and in a line, or substantially so, with the central longitudinal line of said picket, the hook of one link extending over and the hook of the opposite link extending under the supporting rail, and a locking-plate adapted to be driven into the picket between the links and having arms adapted to engage with the said links to lock them securely together, substantially as described. 5th. The combination, with a fence having wooden pickets, of a metallic supporting rail having notches cut into it, and connecting links having centrally projecting hooked arms adapted to engage with said notches, which notches prevents horizontal displacement of said hooked arms, substantially as described. 6th. An improved coupling link for fences, one end of which is shaped to correspond with the shaped of the picket in cross section, and having hooks to engage with the supporting rail, substantially as and for the purpose described.

#### No. 21,352 Vehicle Wheel. (*Roue de Voiture.*)

Melvin L. Smith, Lockport, and Jonas Terry, Batavia, N.Y., U.S., 1st April, 1885: 5 years.

*Claim.*—1st. The axle-box A, and the wooden sleeve B, having a flange a, in combination with the collars C, C, having the flanges D, D, and annular inner flanges E, E, forming the annular spaces F, F, the nuts H, spokes G, and collars I, I, substantially as and for the purpose shown and described. 2nd. The spokes G, having the heads e, in combination with the spoke-socket K, having the socket f, and clips side, g, and the telly having the holes h, bored deeper than the socket and spoke-head, substantially as and for the purpose shown and described.