a heading device located on the side of the work opposite the anvil, for co-operating with the anvil to head the rivet, substantially as described. 24th In a rivetting machine, substantially as herein described, the combination, with the work table, having an aperture therein, a punch and a rivet holding anvil located on one side, the table mechanism, substantially as described, for alternately placing the punch and anvil in line with said aperture, and rivet feeding devices for placing rivets upon the anvil when removed from the aperture of a heading device located on the side of the table opposite the punch and anvil, and mechanism, substantially as described, for operating it, as set forth. 25th. In a rivetting machine, substantially as herein described, the combination of a work support, a punch or awl arranged to enter the work from one side, burr feeding devices, substantially as described, whereby burrs are placed in position on the opposite side of the work from the awl, so that each burr will be centered by the movement of the awl, a rivet inserting anvil interchangeable in position with the awl, independent mechanism, substantially as described, whereby the awl and anvil are successively operated, feeding devices, whereby rivets are supplied to the anvil, and an upsetting hammer located opposite the anvil, and mechanism to operate said hammer, whereby the rivets are upset on the anvil. 26th. In a rivetting machine, the combination of a work support, a punch or awl arranged to enter the work on said support from below, burr feeding devices, substantially as described, whereby burrs are placed upon the upper surface of the work over the awl, so that each burr will be centered by the upward movement of the awl, a rivet inserting device or anvil, which is interchangeable in position with the awl, independent mechanism, substantially as described, whereby the awl and anvil are successively operated, feeding devices, whereby inverted rivets are supplied to the anvil, and an upsetting hammer located above the plane of the work, and mechanism to operate said hammer, whereby the upper ends of the inverted rivets are upset. 27th. In a rivetting machine, substantially as herein described, the combination of a raceway and feeding mechanism cooperating therewith, adapted to feed inverted rivets under the work, a punch or awl adapted to enter the work from below, burr-feeding devices, substantially as described, whereby burrs are placed upon the upper surface of the work over the awl, so that each burr will be centered by the upward movement of the awl, a rivet inserting device or anvil, which is interchangeable in position with the awl, independent mechanisms, substantially as described, for successively operating the awl and anvil, and an upsetting device or hammer located above the plane of the work and mechanism to operate it, whereby the upper ends of the inverted rivets are upset, as set forth. 28th. The combination, with a work support, of a device for holding the burrs in contact with the work, a punch for penetrating the work and centering the burr, and connections between the burr holder and punch, whereby the punch will pass through the work, while the burr is in contact therewith, and means for introducing the rivets through the punched holes, and a heading device for heading them, substantially as described.

No. 30,016. Boom Stick. (*Estacade de port.*)

Frank H. Durell, Bay City, William Goldie, West Bay, and James Reid & Co., St Ignace, Mich., U.S., 20th October, 1888; 5 years.

Claim.—A boom stick, consisting of four timbers, secured together and parallel with each other, and substantially in the form of a cross in transverse section, substantially as and for the purpose set forth.

No. 30,017. Shoal Water Indicator.

(*Indicateur de bas fond.*)

Pedro Vigil and Juan N. Revueltas, Mexico, Mexico, 20th October, 1888: 5 years.

Claim.—1st. The combination, with a weighted vessel, of a non-conducting tube, provided with metallic contacts at its ends, a body of mercury placed in the tube and adapted to establish communication between the contacts at the ends of the tube, and a cable carrying electric conductor, substantially as described. 2nd. The combination, with a vessel A, of the non-conducting tube C provided with metallic disks *d, d*, the mercury filling *e*, the shot *f*, the plate *g*, the head D, the packing ring *o* and packing p, and the cable C and conductors *m, n*, substantially as described.

No. 30,018. Feed Water Heater.

(*Rechauffeur d'eau d'alimentation*)

Edward G. T. Colles, Chicago, Ill., U.S., 20th October, 1888; 5 years.

Claim.—1st. In a feed-water heater, the outer cylinders A and B having a steam space there-between, in combination with the internal steam cylinder H, the space between which and the cylinder B constitutes the water-chamber, and pipes O and Q connecting the ends of said internal cylinder with the steam space between the outer cylinders, substantially as described. 2nd. In a feed-water heater, the outer cylinders A and B having a steam space there-between, in combination with the internal steam cylinder H, lugs or ears N thereon, and screw-bolts M working through said lugs and bearing against the cylinder B, substantially as described. 3rd In a feed-water heater, the outer cylinders A and B, the internal steam cylinder H, the supporting legs thereof L, L, the ears N, N, and screw-bolts M, M, substantially as described. 4th In a feed-water heater, the combination, of the shells or cylinders A and B, the rings C, C, and the caps or covers D and E, whereby both a steam jacket and water-chamber are produced, and the necessity of employing two separate covers for said jacket and chamber dispensed with, substantially as described. 5th. In a feed-water heater, the cylinders A and B, with the rings C, C constituting a steam-jacket, the caps D and E for said cylinders and in connection therewith forming a water-chamber, in combination with the steam-cylinder H located in said water-chamber, supporting legs L, L, ears N, N, screw-bolts M, M, and pipes O and Q connecting said cylinder with the steam-jacket, substantially as described. 6th. In a feed-water heater, the external steam jacket A, B and an internal steam-jacket H, I, the space between which jackets constitutes a water-chamber, in combination with an auxiliary water-chamber R extending into and surrounded, excepting at the bottom, by said internal steam-jacket, substantially as described. 7th. In a feed-water heater, the external steam-jacket A, B, an internal steam-jacket H, I, the space between which jackets constitutes a water-chamber, and pipes O and Q connecting said internal and external steam-jackets, in combination with an auxiliary water-chamber R extending longitudinally into and surrounded, excepting at its open end, by said internal steam-jacket, substantially as described. 8th. In a feed-water heater, an auxiliary water-chamber R open at the bottom, in combination with a feed or supply pipe R1 opening therein, substantially as described. 9th In a feed-water heater, the external and internal steam-chambers or jackets A, B and H, I, with a water-chamber between said internal and external chambers, in combination with an auxiliary water-chamber R connected therewith and projecting into said internal steam-chamber substantially as described. 10th. In a feed-water heater, the external and internal steam-chambers or jackets A, B and H, I, the space between which constitutes a water-chamber, in combination with an auxiliary water-chamber R opening at the bottom into said water chamber and projecting into said internal steam-chamber, and a feed or supply pipe R1 opening into said auxiliary water-chamber having a funnel-shaped discharge end of a slightly less diameter than said chamber, substantially as described 11th. In a feed-water heater, the combination, with the outer shell A provided with a removable end cap E, and brackets V secured thereto on the periphery thereof near the lower end, of supporting legs G rigidly secured to said brackets, substantially as described. 12th. In a feed-water heater, an external steam-jacket A, B, a closed internal steam cylinder H, I, pipes or passages O, Q connecting the ends of said cylinder, in combination with the end-cap E constituting a sediment chamber in the bottom of said water-chamber, substantially as described. 13th. In a feed-water heater, the external steam-jacket A, B, and internal steam-jacket H, I having closed ends, the space between which constitutes a water-chamber, and the lower end-cap of said external steam-jacket constituting a water-chamber, in combination with an auxiliary water-chamber R extending into and surrounded, excepting at the bottom, by said internal steam jacket the bottom of said auxiliary-chamber, opening over the sediment-chamber, substantially as described.

No. 30,019. Hoop Cutting Machine.

(*Machine pour fendre les cercles*)

Alexander F. Ward, Detroit, Mich., U. S., 20th October, 1888; 5 years.

Claim.—1st. A hoop cutting knife mounted to operate in the arc of a circle, with a variable centre of motion to tilt the knife alternately in relation to the stationary bed, substantially as described. 2nd The combination, with the frame and stationary bed of a hoop cutting machine organized to cut bevel hoops from the edge of a plank, a cutting knife secured to an oscillating head to move in the arc of a circle, pivotal connections of said head independent of the frame of the machine, and a shifting device for such pivotal connections controlled by the knife-actuating mechanism to alternately shift the centre of oscillation of the knife, substantially as described 3rd The combination, with the stationary bed of a hoop cutting machine of the reciprocating knife head R carrying the knife in the arc of a circle, of the arms I pivotally secured to the shifting mechanism the wrists i, the main drive shaft R, the eccentrics S and the eccentric rods S1 secured to the wrists i, all arranged to operate substantially as described. 4th. The combination, with the reciprocating knife and stationary table of a hoop cutting machine of the kind described, the cutting blocks formed in sections and secured adjustably and removably in the rear ends of the bed, substantially as described. 5th. The combination, in a hoop cutting machine of the following elements: a stationary table, a cutting knife mounted to reciprocate in the arc of a circle, a knife head pivotally secured independent of the frame and carrying said knife a cutting block secured in the rear end of the table, two or more vertically reciprocating stops at the rear end of the table, two or more vibrating arms to remove the cut hoops from the table, mechanism for reciprocatingly actuating the knife, and mechanism for shifting the pivots of the knife head alternately into one of two positions, substantially as described. 6th. The combination, in a hoop cutting machine, of the stationary table, the cutting knife reciprocating in the arc of a circle, the knife head pivotally secured independent of the frame of the machine and carrying the cutting knife, the main drive shaft R, the counter shaft G, the eccentric N1, the lever M connected to the eccentric and provided with the cam groove *f*, the rock arm L on the rock shaft L1, the links J, K, the parts being arranged and constructed to operate substantially as described.

No. 30,020. Cigar. (*Cigare.*)

Henry T. Offterdinger, Washington, D.C., U.S., 20th October, 1888 5 years.

Claim.—1st. As a new article of manufacture, a cigar made wholly of tobacco, its body portion of substantially cylindrical form and its tip or mouth end compressed to a flattened form, as described and shown. 2nd As a new article of manufacture, a cigar having its tip end compressed and solidified, and its body relatively soft and porous. 3rd. As an improvement in the art of manufacturing cigars, the method consisting in forming the body as usual of substantially round form in cross-section at all points, and subsequently compressing and flattening the tip end as described, to give the same increased solidity and a permanently flattened form, while the body portions remain in substantially its original form and size. 4th. The improved mould for a cigar having its interior cavity of round form in cross-section, except at the tip end, and of flattened form at that point.

No. 30,021. Water Proof Composition for Paper. (*Composition imperméable à l'eau pour papier.*)

William H. Fay, Camden, N.J., U.S., 20th October, 1888; 5 years.

Claim.—A composition for rendering paper water-proof, tough,