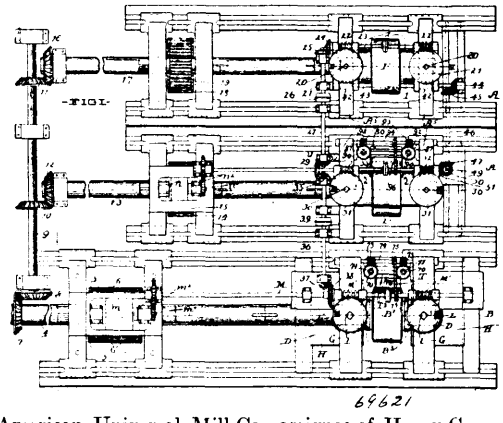
between the loop and the welding tools, and means for heating the ends of the loop, while it is comparatively distant from the welding tools between the bending and welding operations, substantially as described. 2nd. In a chain making machine, mechanism for passing a bar of metal through a link, mechanism for bending it into a loop in this position, mechanism for bending the ends of the loop together mechanism for moving the loop away from the welding mechanism, means for then heating the ends of the loop to a welding heat, and mechanism for then bringing the heated loop to the welding mechanism, in combination with such welding mechanism, substantially as described. 3rd. In a chain making machine, the combination of mechanism for holding a link, means for heating a bar, mechanism for moving the heated bar into the link, mechanism for bending said bar into a loop, mechanism for completing the loop into a new link, and mechanism which comes into action just preceding the completing mechanism, and is adapted to separate the loop and such completing mechanism and again return them, and means for heating such newly formed loop while it is thus separated from the completing mechanism, substantially as described. 4th. In a chain making machine, in combination, means for supporting a chain, means for moving material for a new link into the last completed link, mechanism for bending such material into a loop, mechanism for bending the ends of the loop upon each other, mechanism for squeezing them together, and means for heating the ends of the loop during the operation and just preceding their being squeezed together, substantially as described. 5th. The combination with mechanism for forming a loop of metal in the end of a chain, mechanism for welding together the ends of said loop, a liquid electric forge, and mechanism for dipping the ends of the loop into the liquid between the forming and welding operations, substantially as described. 6th. The combination with a liquid electric forge, of a trough adapted to carry a chain with a partly formed link, means for giving said trough a movement to and from said forge, whereby said partly formed link is heated, and means for welding the partly formed link, substantially as described. 7th. In a chain making machine, in combination, a trough adapted to hold a portion of the chain, means far establishing a loop for a new link in the end link of the trough mechanism for moving the trough out of its normal position, an electric forge into which the loop passes in such movement whereby the loop becomes heated, and mechanism for welding the loop, substantially as described. 8th. In a chain making machine, in combination, a pivoted trough, a liquid electric forge beneath the same, said trough being adapted to carry a chain and a new link being formed and swing it downward to said forge whereby the new link becomes heated, substantially as described. 9th. In a chain making machine, in combination, a trough adapted to carry a portion of the chain, a bevelled block b^5 near one end thereof, and a mechanism for drawing the chain along the trough whereby the bevelled block turns the link at that and about its axis, substantially as described. 10th. In a chain making machine, in combination, a trough B adapted to carry a portion of a chain, a bevelled block b^5 near one end thereof, and spring arm b^4 adapted to bear on one side of a link being made whereby as the link is withdrawn it is turned about its axis approximately 90 degrees, substantially as described. 11th. In a chain making machine, in combination, a pivoted trough adapted to carry a chain, a lever adapted to bear on said trough and hold it in normal position, mechanism for actuating said lever to move it away from the trough whereby the trough moves into another position substantially as described. 12th. In a chain making machine, the combination of a pivoted trough adapted to carry a portion of the chain, mechanism for feeding the material for a new link into a link in said trough, a pair of formers, means for causing said farmers to bend the new material into a loop, and heating means so located that the pivoted trough may swing the link being formed thereto, substantially as described. 13th. The combination, in a machine for making chain, of a pivoted trough, adapted to carry a portion of the chain, a liquid electric forge, means for causing said trough to move to and from said forge, means for moving material for a new link into a ink in said trough, an inside former, a pair of outside formers adapted to bend the new material against the inside former into a loop, and means for welding together the ends of the loop substantially as described. 14th. In a chain making machine, the combination of a trough adapted to carry a portion of the chain, mechanism for feeding the material for a new link into a link in said trough, a bifurcated slide lying on opposite sides of the trough, rigid formers carried on said slide, and means for forcing said slide forward whereby the formers bend the new material into a loop, substantially as described. 15th. The combination, with means for holding a link being formed in the end of a chain, of a liquid electric forge, mechanism for moving said liquid into said forge, and a pair of pivoted jaws, and mechanism for advancing the same until they stand on opposite sides of the new link, and for then bringing them together to weld said link, substantially as described. 16th. In a chain making machine, the combination of means for holding the chain already made, a pair of formers adapted to bend a rod extending through the last link in the chain into a loop shape, an inside former adapted to stand within such loop, a pair of lateral formers adapted to bend the ends of the loop together to make a link shape, and a pair of jaws adapted to pinch together said ends, there being means for heating said ends to a welding heat substantially as described. 17th. The combination, in a chain making machine, of two liquid electric forges, one adapted to give more intense heat than the other, mechanism for feeding the material heated by the less intense forge into a link of a chain, mechanism for bending said material into a link form, mechanism for bending said material into a link form, mechanism for bringing it into the other forge to heat its ends to a welding heat, and a mechanism for squeezing said ends together to weld them, substantiolly as described. 18th. In a chain making machine, in combination, mechanism for feeding forward stock, a rod with which said stock engages, a tank containing a liquid, said rod and liquid forming the terminals of a liquid electrical forge whereby said stock is heated, means for cutting of said stock, and means for forming a link out of said cut off portion, substantially as described.

No. 69,621. Rolling Mill. *(Laminoir.)*



The American Universal Mill Co., assignee of Henry Grey, all of London, England, 6th December, 1900; 6 years. (Filed 2nd December, 1899.)

Claim.—1st. In a rolling mill of the character indicated, two flange edge rolling rolls arranged to operate upon opposite flange edges, respectively, screws and engaging nuts instrumental in shifting one of the said rolls, worm wheels operatively mounted upon the said screws in such a manner that the screws can move endwise independently of the wheels, a worm shaft having worms engaging the said wheels, screws and engaging nuts instrumental in shifting the other roll, worm wheels operatively mounted upon the last mentioned screws in such a manner that the screws can move endwise independently of the wheels, a worm shaft having worms engaging the last mentioned worm wheels, a shaft operatively connected with both said worm shafts, and a clutch arranged in the line of the last mentioned shaft, and adapted to establish and interrupt continuity in the shaft. 2nd. In a rolling mill of the character indicated, a flange edge rolling roll arranged to operate upon the flange edges at one side of the web and shiftable toward and from the work, a roll arranged opposite the said flange rolling roll in position to afford bearing for the work during the operation of the said flange edge rolling roll, another flange edge rolling roll arranged to operate upon the flange edges at the other side of the web and shiftable toward and from the work, and another roll arranged opposite the last mentioned flange edge rolling roll in position to afford bearing for the work during the operation of the said flange edge rolling roll. 3rd. In a rolling mill of the character indicated, a flange edge rolling roll arranged to operate upon the flange edges at one side of the web and shiftable toward and from the work, a roll arranged opposite the said flange edge rolling roll in position to afford bearing for the work during the operation of the said flange edge rolling roll, another flange edge rolling roll arranged to operate upon the flange edges at the other side of the web and shiftable toward and from the work, and another roll arranged opposite the last mentioned flange edge rolling roll in position to afford bearing for the work during the operation of the said flange edge rolling roll, and mechanism whereby both of the flange edge rolling rolls are shiftable simultaneously in opposite directions, respectively. 4th. In a rolling mill of the character indicated, two flange edge rolling rolls arranged to operate upon opposite flange edges, respectively, and arranged a suitable distance apart laterally of each other, and shiftable toward and from the work's path, a roll arranged opposite one of the said flange edge rolling rolls, another roll arranged opposite the other flange edge rolling roll, and mechanism whereby both of the flange edge rolling rolls are shiftable simultaneously and equally in opposite directions, respectively. 5th. In a rolling mill of the character indicated, two vertically shiftable flange edge rolling rolls arranged, respectively, above and below the work's path in position to operate upon the edges of the flanges of the work, and arranged, furthemore, a distance apart laterally of each other, a roll arranged opposite one of the said flange edge rolling rolls in position to afford bearing for the web of the work, and another roll arranged opposite the other flange edge rolling roll in position to afford bearing for the work's web. 6th. In a rolling mill of the character indicated, two vertically shiftable flange edge rolling rolls arranged at the upper side