

(No Model.)

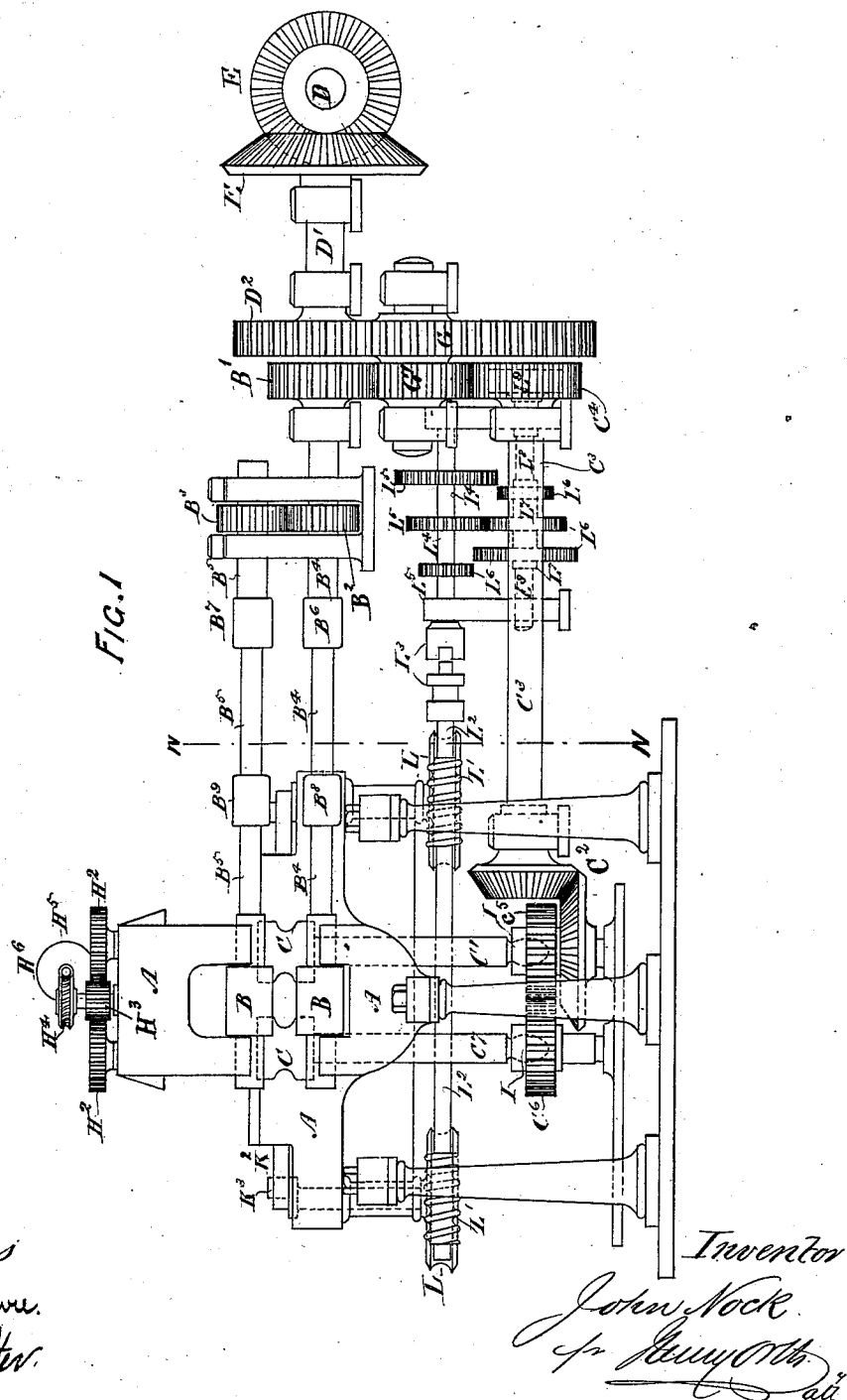
4 Sheets—Sheet 1.

J. NOCK.

MACHINE FOR FORGING ANCHORS.

No. 273,135

Patented Feb. 27, 1883.



Witnesses
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(No Model.)

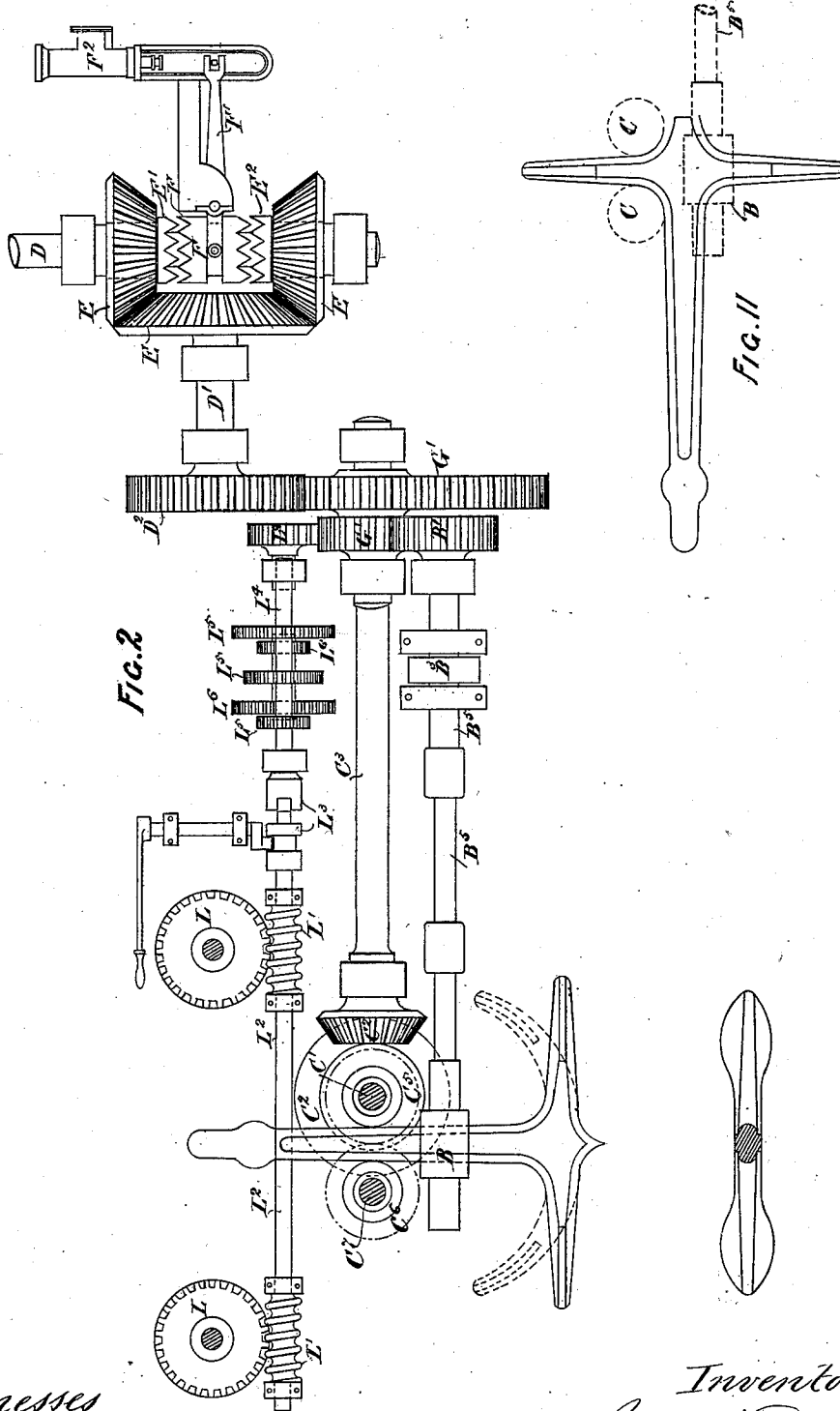
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Patented Feb. 27, 1883.



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(No Model.)

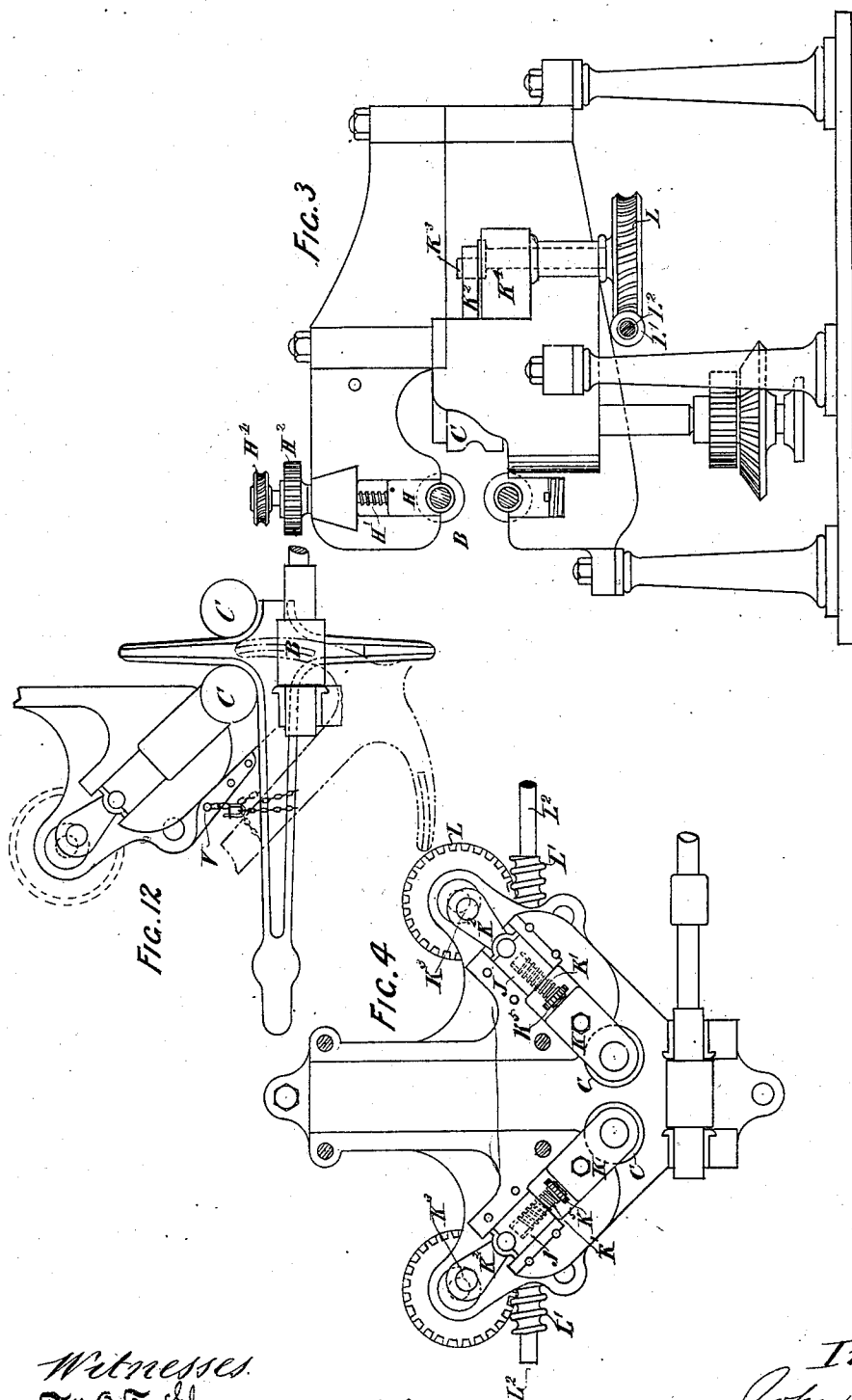
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MACHINE FOR FORGING ANCHORS.

No. 273,135.

Patented Feb. 27, 1883.



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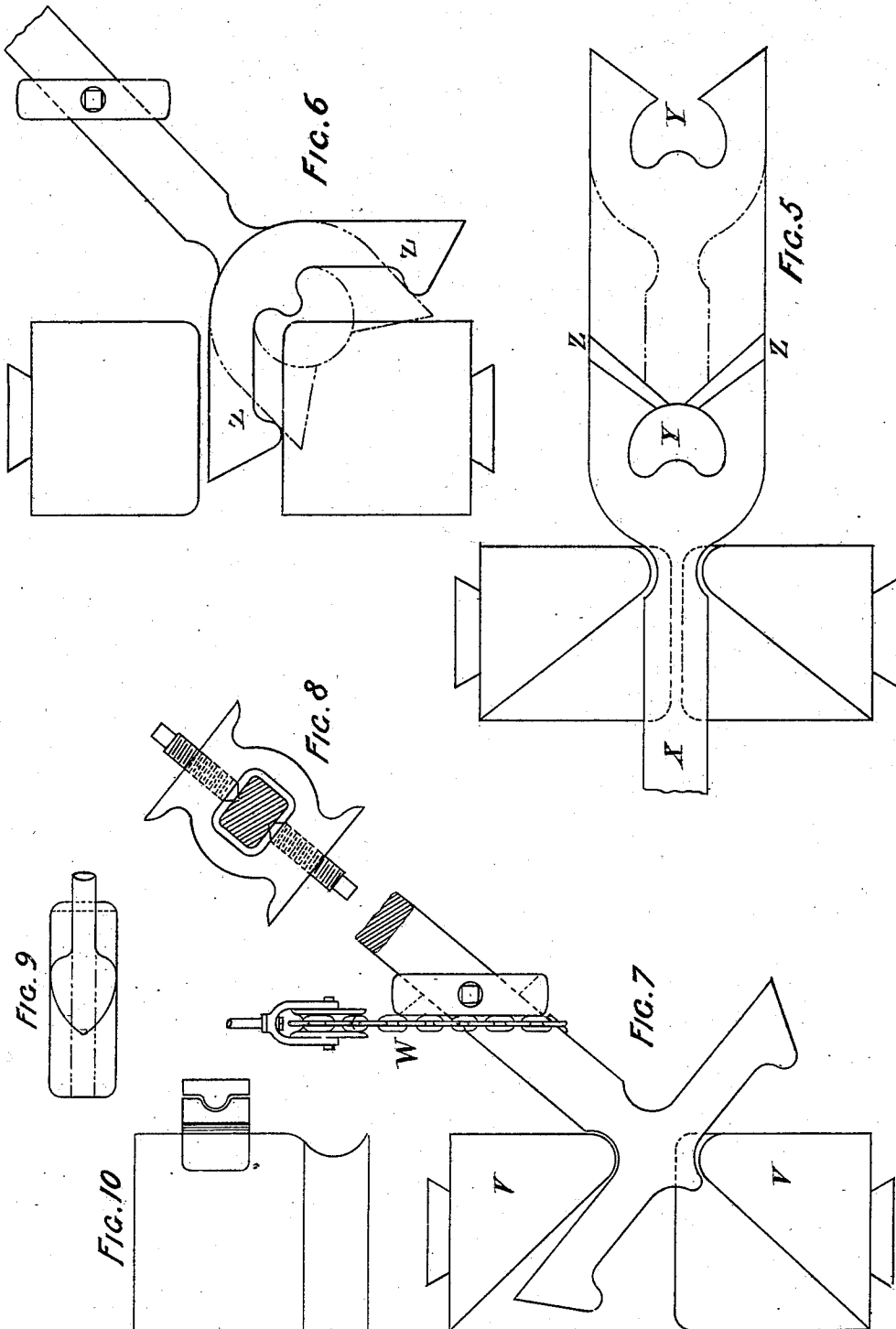
J. NOCK.

4 Sheets—Sheet 4.

MACHINE FOR FORGING ANCHORS.

No. 273,135.

Patented Feb. 27, 1883.



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UNITED STATES PATENT OFFICE.

JOHN NOCK, OF CONSTANTINOPLE, TURKEY.

MACHINE FOR FORGING ANCHORS.

SPECIFICATION forming part of Letters Patent No. 273,135, dated February 27, 1883.

Application filed July 5, 1882. (No model.) Patented in England December 29, 1881, No. 5,708.

To all whom it may concern:

Be it known that I, JOHN NOCK, a subject of the Queen of England, and residing at Hass-keny, Constantinople, in the Empire of Turkey, have invented new and useful Improvements in the Manufacture of Anchors, and in Machinery or Apparatus Therefor, (for which I have obtained provisional protection in Great Britain, dated 29th of December, 1881, No. 5,708,) of which the following is a specification.

This invention has for its object the production of anchors rolled from one solid ingot of steel or iron, and therefore insures greater strength and solidity than is possessed by anchors forged and welded up by the hammer process, as at present, and does away with the system of filling in the crown or thick part of the anchor by welding pieces therein, as is usually done at the forge at the present time. Figure 1 is a front elevation of the rolling-mill; Fig. 2, a plan view of the same; Fig. 3, a section on line Z Z of Fig. 1, looking to the left; Fig. 4, a plan view of Fig. 3. Figs. 5, 6, 7, 8, 9, and 10 illustrate the various steps of the process of making anchors from a single bloom or ingot previous to mill-finishing or milling the same. Fig. 11 shows the arm of the anchor passing through the rolls.

I prepare a flat slab of iron or ingot of steel, rectangular in section, and containing sufficient metal to form the anchor, as shown in Fig. 5. Sufficient metal is next "edged" (under the hammer) into the form of a square or rectangular bloom of convenient size to roll the shank from, (see X, Fig. 5.) The main portion or head of the slab is now punched out in somewhat of a crescent shape, Y, Fig. 5, and two cutters are then placed upon it, which split the metal open and give it the triangular shape shown in Fig. 6, Z Z, Fig. 5, showing where the slab is cut from the main body of metal. The two arms are then thrown back at right angles to the shank, (see Fig. 7,) and the flukes are then spread out into their usual form upon swage-blocks, as in Figs. 9 and 10, which form the round parts of the arms at the backs of the palms, Fig. 10. Fig. 7 shows the throat of the anchor reduced to its required size by the top and bottom hammer-blocks, V. Fig. 8 shows a dog fixed on the shank to prevent the bridle-chain W from slipping up during the forging operation, and the rough forg-

ing is now ready for the mill, which I shall next proceed to describe.

The foregoing process will be well understood by those skilled in the art of forging anchors in the ordinary manner.

A A, Fig. 1, are portions of the strong general framing of the mill.

B B are top and bottom horizontal rolls which flatten out the shank of the anchor, and C C are two vertical rolls which "edge in" the same.

D is the main shaft, which drives the whole mill by means of the bevel-gearing E, reversing being accomplished by the clutch F working upon feathers in shaft D and gearing with clutches E' and E² upon bevel-wheels E, as will be well understood.

F' is a clutch-lever for operating the clutch F, and F² is a cylinder for working the lever.

Upon shaft D', which carries the large bevel-wheel E, is a spur-wheel, D², which gears with the large spur-wheel G, and upon the shaft of G is fixed another spur-wheel, G', which, gearing with wheel B', drives the bottom roll B, while the small spur-wheel B² upon the shaft B⁴, which drives bottom roll B, gearing with wheel B³ upon shaft B⁵, drives the top roll B. Wheel G' also gears with another wheel, C⁴, upon shaft C³, which, through bevel-gearing C² and spur-wheel C⁵ on vertical shaft C', drives one roll C. Spur-wheel C⁵ gears with a like wheel, C⁶, upon vertical shaft C⁷, which carries the second roll C. The shafts B⁴ and B⁵ are in separate pieces, joined by loose boxes B⁶ and B⁷ and coupling-boxes, the object of the loose boxes being to allow of the distance between the rolls B being varied, as will be best understood by reference to Figs. 1 and 3. Top roll B has its bearings in movable blocks H, capable of being raised or lowered by screws H', the top end of each of which carries a spur-wheel, H², both of which gear with a pinion, H³, upon the shaft whereof is a worm-wheel, H⁴, turned by worm H⁵, which may be driven by power in any convenient manner, or by a hand-wheel, H⁶, as shown. The rolls C are also adjustable laterally, as shown in Figs. 1, 3, and 4, the shafts C' and C⁷ being stepped in loose boxes I, Fig. 1, to permit of this. In the plan, Fig. 4, the rolls C take their top bearings in movable blocks K, capable of sliding in the frame-work.

As shown, K' are screws which screw into blocks J, which are suitably jointed to links K², whose other ends take onto eccentrics K³ upon the upper ends of shaft K⁴, Fig. 3. The lower ends of the shafts K⁴ carry worm-wheels L, operated by worms L', both of which worms are secured upon or form part of the same horizontal shaft L². As the shaft L² revolves, it turns both worms and worm-wheels at the same speed, and these, by shafts K⁴ and eccentrics K³, operate links K², which draw out or force in the blocks J and K and rolls C at an equal rate, thus forming an even taper upon the shank of the anchor placed between them. The screws K' are formed with a hexagonal collar, ratchet, or other suitable device, K⁵, whereby they may be turned by hand for adjustment, or when parallel work is to be rolled instead of taper.

Upon shaft L² is a clutch, L³, Fig. 1, by which that part of the shafts which carries the worms can be disconnected when tapered work is not in hand, and the worm arrangement is therefore not required. L⁴ is really a continuation of shaft L², and joined to it by clutch L³ when in gear, and upon L⁴ are different-sized gear-wheels L⁵, which take their motion from corresponding wheels, L⁶, (but so placed that the largest wheel L⁶ gears with the smallest wheel L⁵, and the largest L⁵ with the smallest L⁶, and only one pair of wheels is fully in gear at one time,) fixed upon a sleeve, L⁷, which slides upon a counter-shaft, L⁸, driven by the gear-wheel L⁹, which in turn gears with and receives motion from C⁴. It thus appears that by means of the differential gear L⁵ and L⁶ the speed at which the rolls C are separated, and therefore the amount of taper on the shank of the anchor, can be regulated at will, or no taper at all be formed by disconnecting the clutch L³.

The operation of the mill is as follows: The anchor-stock is inserted between the rolls B B, which flatten out the metal and form the sides of the stock. The stock passes onto the vertical rolls C C, which edge the metal in, give the required taper, as already explained, and also form the bulge for the hole near the end. The stock is then withdrawn and the arms inserted in turn, and formed and tapered. Each portion is passed through the rolls as often as necessary—usually not more than six times. After the three limbs have been successively rolled to shape the two arms, which stand at right angles to the shank, are curved to their required form the last time of passing through the rolls by means of a chain-guide, as will be readily understood by referring to Fig. 12, where the anchor is shown secured by a chain to the pin U, passing through a hole in a web or projection upon the frame-work, where there are several of these holes to suit anchors of different sizes. A center is thus

formed, round which the anchor travels as the arm passes through the rolls C. The dotted lines show the curve into which the arms are thus formed. This gives the requisite curve at the throat of the anchor, and if the tips are not quite curved enough they can be finished afterward.

Having now described my invention and the method of carrying it into practical effect, I claim—

1. In a mill or machine for rolling anchors, mechanism for rolling the shank and arms of a uniform taper, which consists of a pair of horizontal and a pair of vertical rolls, B B C C, operating in conjunction with each other, and mechanism, substantially as described, for causing the rolls of each pair to automatically and gradually recede from each other as the anchor-shank passes between them, substantially as and for the purposes specified.

2. In a mill for rolling anchors, the combination, with the adjustable rolls C, of eccentrics K³, worm-wheels L, and worms L' and their connecting mechanism, said worms being rigidly connected by shaft L², so as to work simultaneously, whereby said rolls C can be caused to approach or recede from each other at an equal speed, substantially as and for the purposes set forth and shown.

3. In combination with rolls C, the blocks K and J and screws K', whereby the rolls can be adjusted by hand, independently of the other operating mechanism, substantially as and for the purposes set forth and shown.

4. In a mill or machine for rolling anchors, mechanism for rolling the shanks of a uniform taper, which consists of a pair of rolls, C C, mechanism for rotating said rolls, and mechanism, substantially such as described, to cause the rolls of each pair to recede from each other as the anchor-shank passes between them, in combination with mechanism to impart to said rolls a differential speed, which consists of the counter-shaft L⁸, differential-gear wheels L⁵, differential-gear wheel L⁶, the shaft L⁴, and intermediate gearing, whereby said parts are driven from a common driving-shaft, substantially as shown and described.

5. The combination, with the rolls C C, their shafts C' C', gearing C⁵ C⁶, shaft C³, gear-wheel C⁴, and mechanism, substantially as described, for causing said rolls to gradually recede from each other at a differential speed, of appliances for throwing the latter mechanism out of operation and move the rolls at a uniform speed on a fixed axis, substantially as shown and described.

JOHN NOCK.

Witnesses:

JAMES ROWE,
JOHN FERGUSON.