No. 644,919 Patented Mar. 6, 1900.

J. ILLINGWORTH.

ROD STRAIGHTENING AND FINISHING MACHINE.

(Application filed Aug. 8, 1899.)

(No Model.) 4 Sheets—Sheet 1.

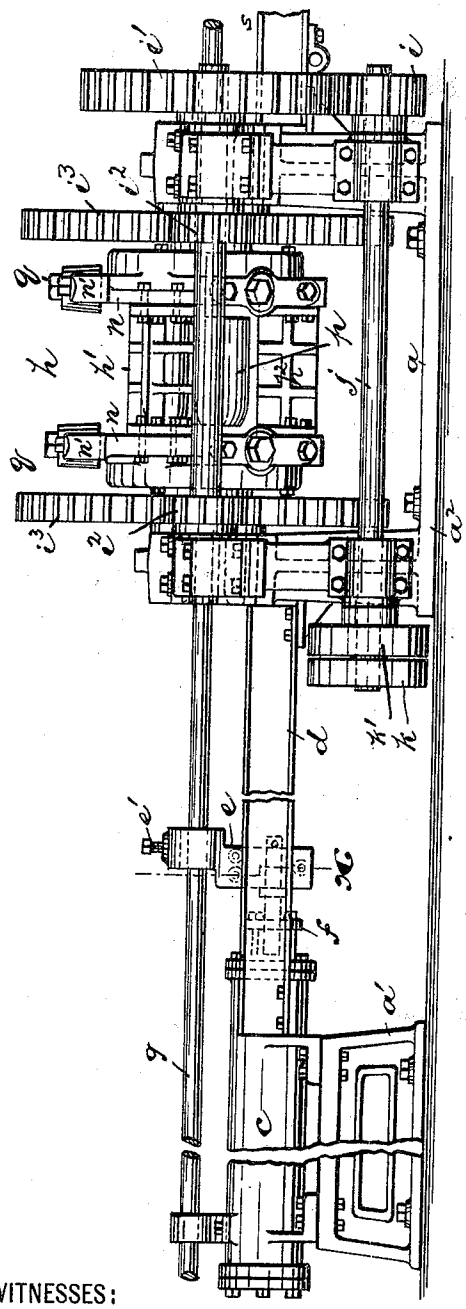


Fig. 1.

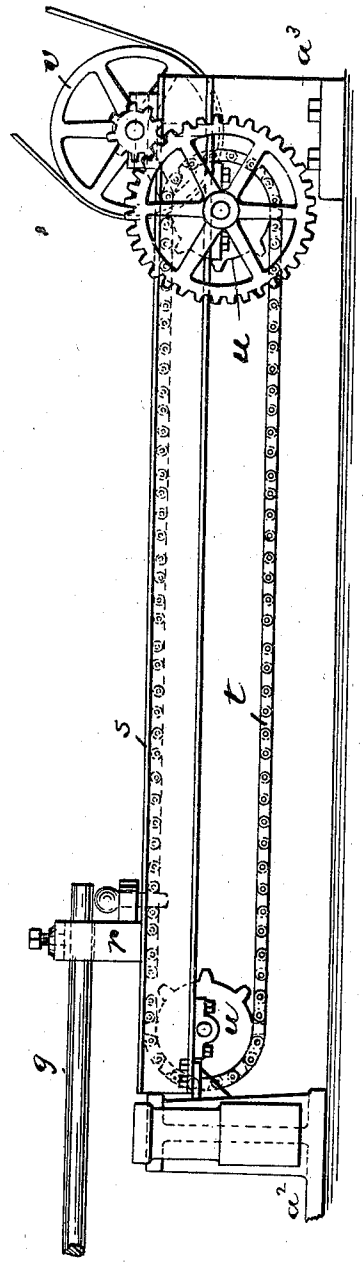


Fig. 2.

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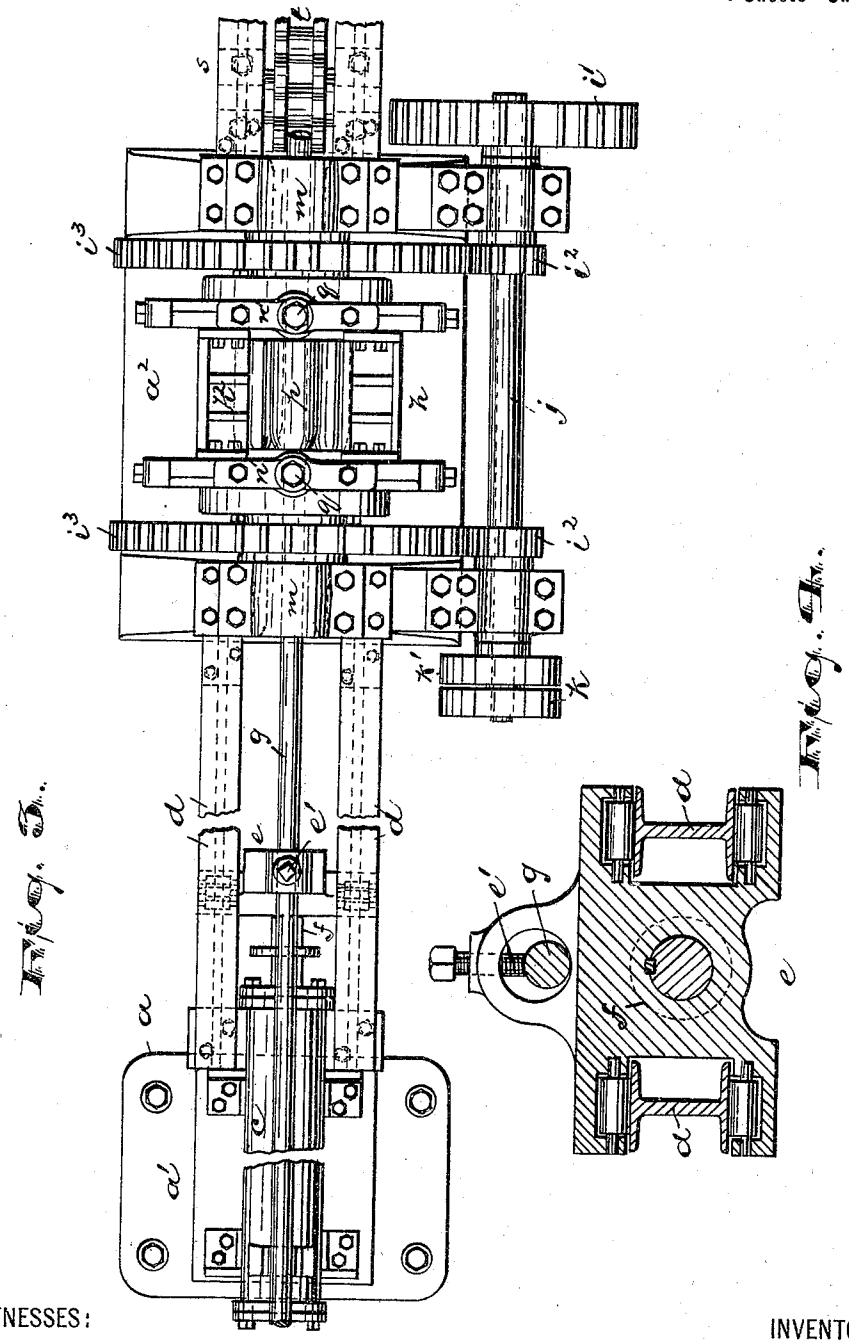


Fig. 3.

Fig. 4.

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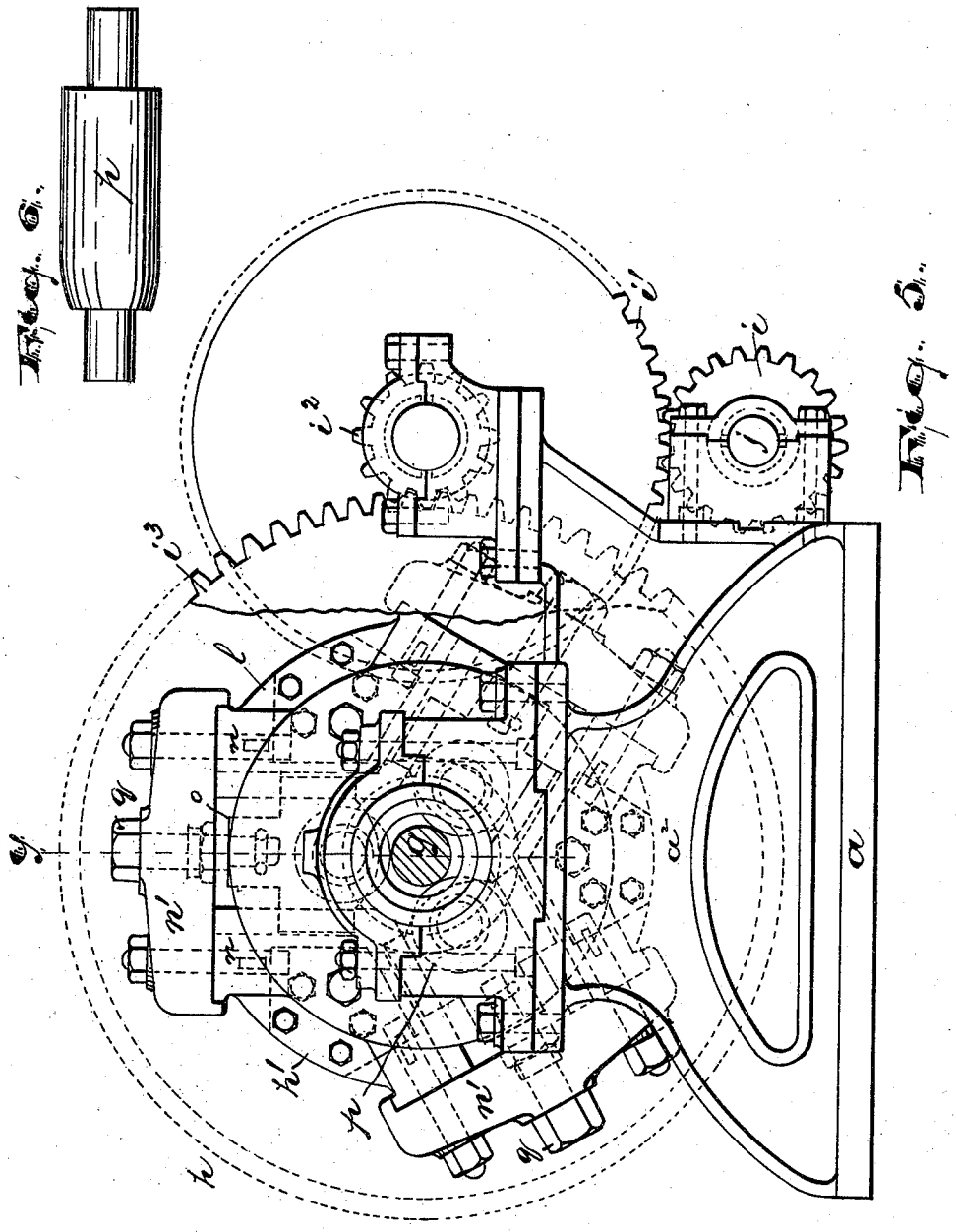
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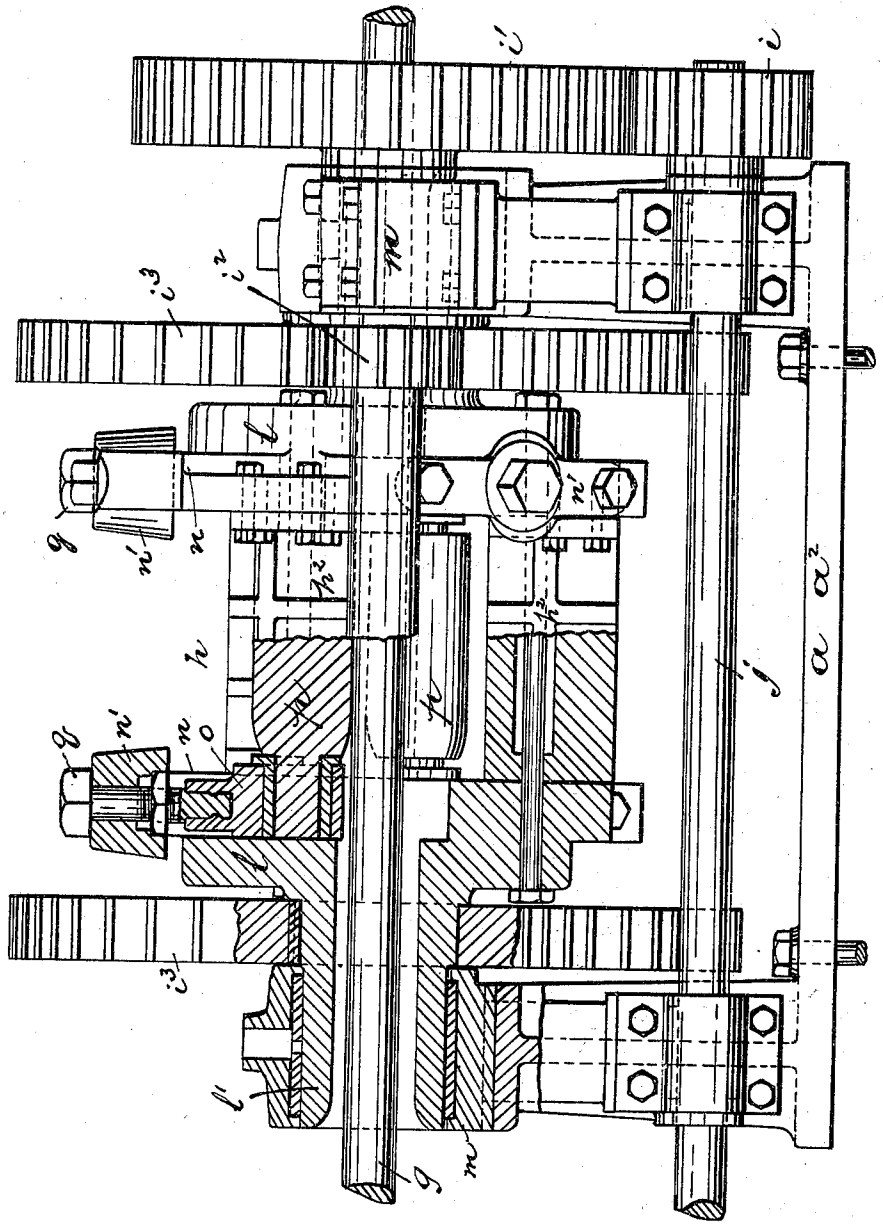


Fig. 4.

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UNITED STATES PATENT OFFICE.

JOHN ILLINGWORTH, OF NEWARK, NEW JERSEY.

ROD STRAIGHTENING AND FINISHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 644,919, dated March 6, 1900.

Application filed August 8, 1899. Serial No. 726,500. (No model.)

To all whom it may concern:

Be it known that I, JOHN ILLINGWORTH, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Rod Straightening and Finishing Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

The objects of this invention are to facilitate the operation of straightening cold-drawn rods and to secure a more perfect product, to remove from said rods the longitudinal marks due to contact with the dies in drawing the same through said dies, and at the same time to polish the said rods and to secure other advantages and results, some of which may be referred to hereinafter in connection with the description of the working parts.

The invention consists in the improved rod-straightening machine and in the arrangements and combinations of parts of the same, all substantially as will be hereinafter set forth and finally embraced in the clauses of the claim.

Referring to the accompanying drawings, in which like letters of reference indicate corresponding parts in each of the several views, Figure 1 is a side elevation of a portion of the improved rod-drawing machine, showing the relation of the several parts to one another. Fig. 2 is a side elevation of the remaining portion of the same. Fig. 3 is a plan of the portion of the machine shown in Fig. 1. Fig. 4 is an enlarged detail section taken through line x, Fig. 1. Fig. 5 is a detail end view of the straightening-head and coöperating parts, and Fig. 6 is a detail of one of the rolls employed in said straightening-head. Fig. 7 is a detail side elevation of the said straightening-head and coöperating parts, partly in section, the section being taken through line y, Fig. 5.

In said drawings, a indicates a suitable bed-plate, which may be of several members a' a^2 a^3, joined either integrally or separably, or they may be connected to one another only by the floor to which they are bolted. At one end of said frame or bed a or upon the frame member a' thereof is erected and secured a hydraulic cylinder c. Forward from said cylinder is arranged a slideway d. This comprises parallel girders or heavy metal bars which connect the frame members a' a^2 and upon which is arranged a grip device e, which is attached or connected to the piston-rod f of the hydraulic cylinder c and is adapted to move backward and forward reciprocally with said piston-rod. At the upper part of said grip e the same is provided with gripping means e' of any suitable construction, adapted to grasp the rod g and force the same longitudinally under the force of the piston and grip e into the straightening-head h. The said straightening-head h is arranged upon the bed-machine and furnished with bearings for a train of gear-wheels i i' i^2 i^3 and a driving-shaft j, the said shaft carrying the gear-wheel i at one end and fast and loose pulleys k k' at the opposite end. The said gear-wheels and pulleys receive motion from any suitable source of power and transmit said motion to a straightening-roll carrier h', rotating between and with the gear-wheels i^3 i^3. The gear-wheels i^3 i^3 are secured upon side plates or cheeks l l, held rigidly against displacement by ribs or braces h^2. Said plates l have hubs l' l' arranged in boxes or bearings m m of the bed member a^2. Said hubs l' are axially bored out to permit a passage of the rod to be straightened, the passages in said hubs being in line with the rod-gripping means, so that the rod may be pushed longitudinally through said passage and between the straightening-rolls without bending. The said straightening-head provides bearings or slideways n n for a series of sliding boxes o, in which are journaled the rolls p p p for pressing against the periphery of the rod as the roll-carrier rotates. The peripheries of the rolls lie longitudinally close to the line of the hub-passages, and thus impinge upon the periphery of the rod passing therethrough. The peripheries of said rolls p p p are straight, excepting at the end toward the gripping means, where they are beveled or rounded off, as shown in Fig. 6, to provide an enlarged opening, permitting an easy insertion of the rod into the longitudinal space between said rolls.

The journal-boxes *o* for the rolls are adapted to be adjusted toward or from the axial center of the rotary straightening-head by means of suitable adjusting-screws *q*, so that the pressure of the rolls upon the rod *g* may be increased or diminished at pleasure. Said screws are inserted in threaded bearings formed in the plates *n'*, secured to the outer ends of the ways *n*.

As the straightening-head revolves on its axial trunnions the hydraulic piston is forced forward and carries with it the gripping device and rod, forcing said rod slowly through the space formed by the rolls. Thus the rod is pressed with a rolling pressure at three or more sides thereof at one time, and the rolls are carried around the said rod, so that all curvature is pressed out therefrom, and the rod is given a true straightness and increased surface finish. The rolls are caused to revolve on their bearings by frictional contact with the rod, the positive motion being imparted from the gearing to the straightening-head and not to the rolls, except as above indicated. After being released from the hydraulic grip and passing between the straightening-rolls the rod is gripped by a drawing device *r*, arranged upon a suitable slideway *s*, the second gripping device being arranged in connection with endless chains *t*, arranged upon sprocket wheels or pulleys *u* in connection with suitable power-pulleys *v*, receiving power from any suitable source. The second grip, operated as above indicated, continues the forward movement of the rod, drawing the same through the straightening-head as the latter rotates, and the rolls revolve and rotate until the straightening operation is completed.

Having thus described the invention, what I claim as new is—

1. The combination with suitable grips, of a straightening-head, and means for rotating the same, the said straightening-head having therein a series of straightening-rolls adapted to engage the periphery of the rod at a plurality of points in the same perpendicular plane, substantially as set forth.

2. The combination with a straightening-head, and means for rotating the same, the said straightening-head having a series of rolls adapted to engage the periphery of the rod at one point of its length, of a hydraulic pushing-grip adapted to force the rod longitudinally between said rolls, substantially as set forth.

3. The combination with a straightening-head, and means for rotating the same, said head having a series of rolls arranged in a whirl or circle around the axial center of the head and being radially adjustable, of a pushing-grip adapted to force the rod longitudinally through the axial center of said head, substantially as set forth.

4. The combination of a rotating straightening-head having parallel annular cheeks and ribs or braces extending therebetween, rolls independently pivoted in said cheeks and lying between the ribs in a circle around the axial center of the head and being radially adjustable, and pushing and pulling grips disposed at opposite sides of said straightening-head, substantially as set forth.

5. In combination with a rotary straightening-head, having opposite rolls adjustably arranged parallel with the axis of said head and fixed in one transverse plane, a grip for forcing the rod between the rolls and means for operating the rolls and grip, substantially as set forth.

6. In combination with a rotary straightening-head comprising a pair of side plates having hollow trunnions and slideways with adjustable boxes in said slideways, and parallel rolls arranged in said boxes, and means for forcing the rod to be straightened or treated through said hollow trunnions and between said rolls and operating means, substantially as set forth.

7. The combination with a rotary straightening-head, comprising a pair of side plates having hollow trunnions and gearing in connection therewith for transmitting rotary motion thereto, boxes having slideways on said side plates, rolls beveled at the ends toward the rod-pushing devices, said rod-pushing devices, and means for operating the gearing, all substantially as and for the purposes set forth.

8. The combination with a rotary straightening-head, comprising a pair of side plates with a collection of parallel rolls adapted to engage the periphery of a rod passing longitudinally therebetween, said rolls being beveled or rounded at the ends from which the rod is first fed, and pushing and pulling grips and means for operating the same, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 20th day of June, 1899.

JOHN ILLINGWORTH.

Witnesses:
CHARLES H. PELL,
RUSSELL M. EVERETT.