3 Sheets--Sheet 1.

J. GOODALE.

Machines for Casting Printers' Leads.

No. 155,609. Patented Oct. 6, 1874.

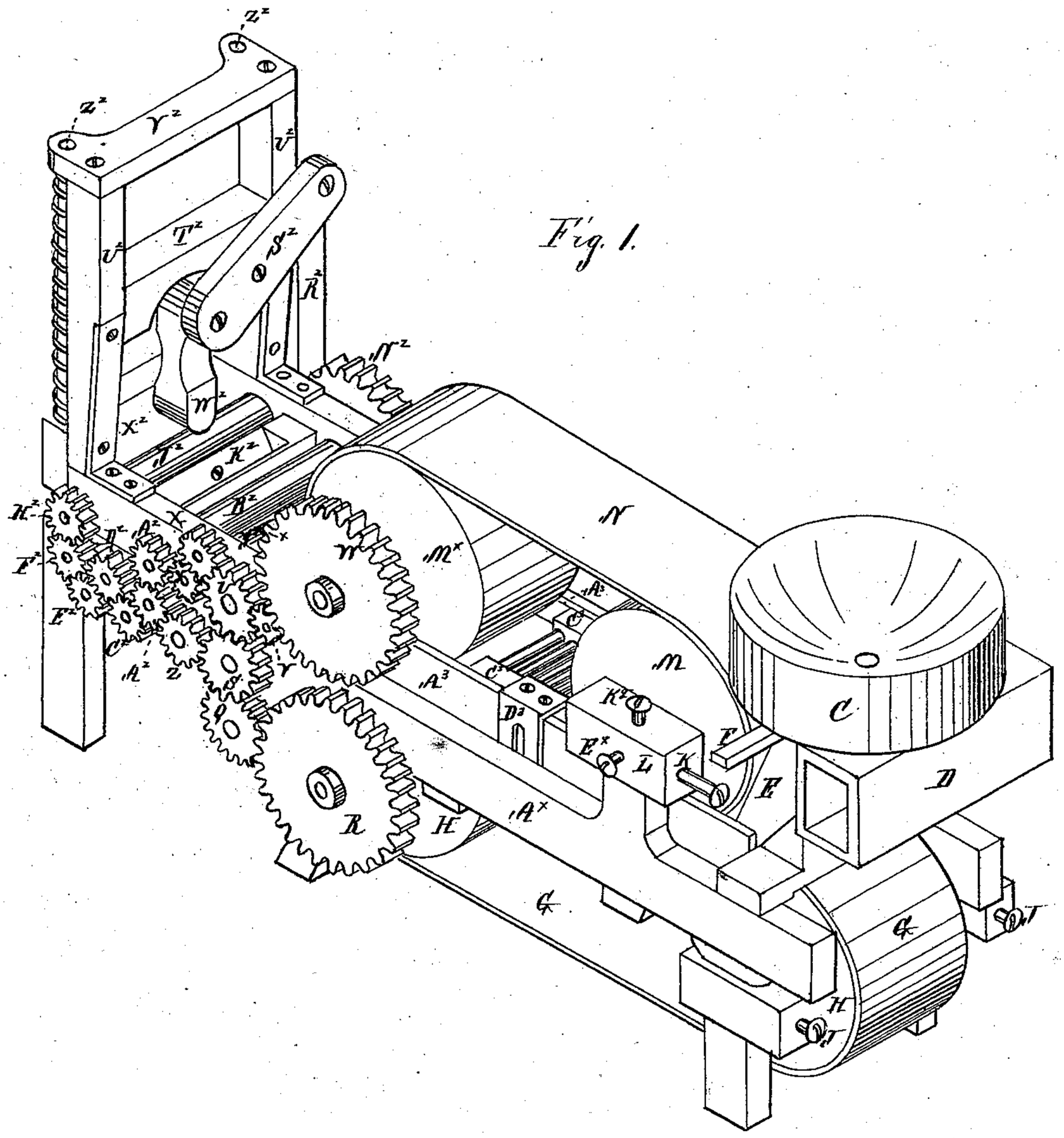

Fig. 1.

Witnesses,

Lemuel P. Deuks.

S. Davis

Inventor,

John Goodale

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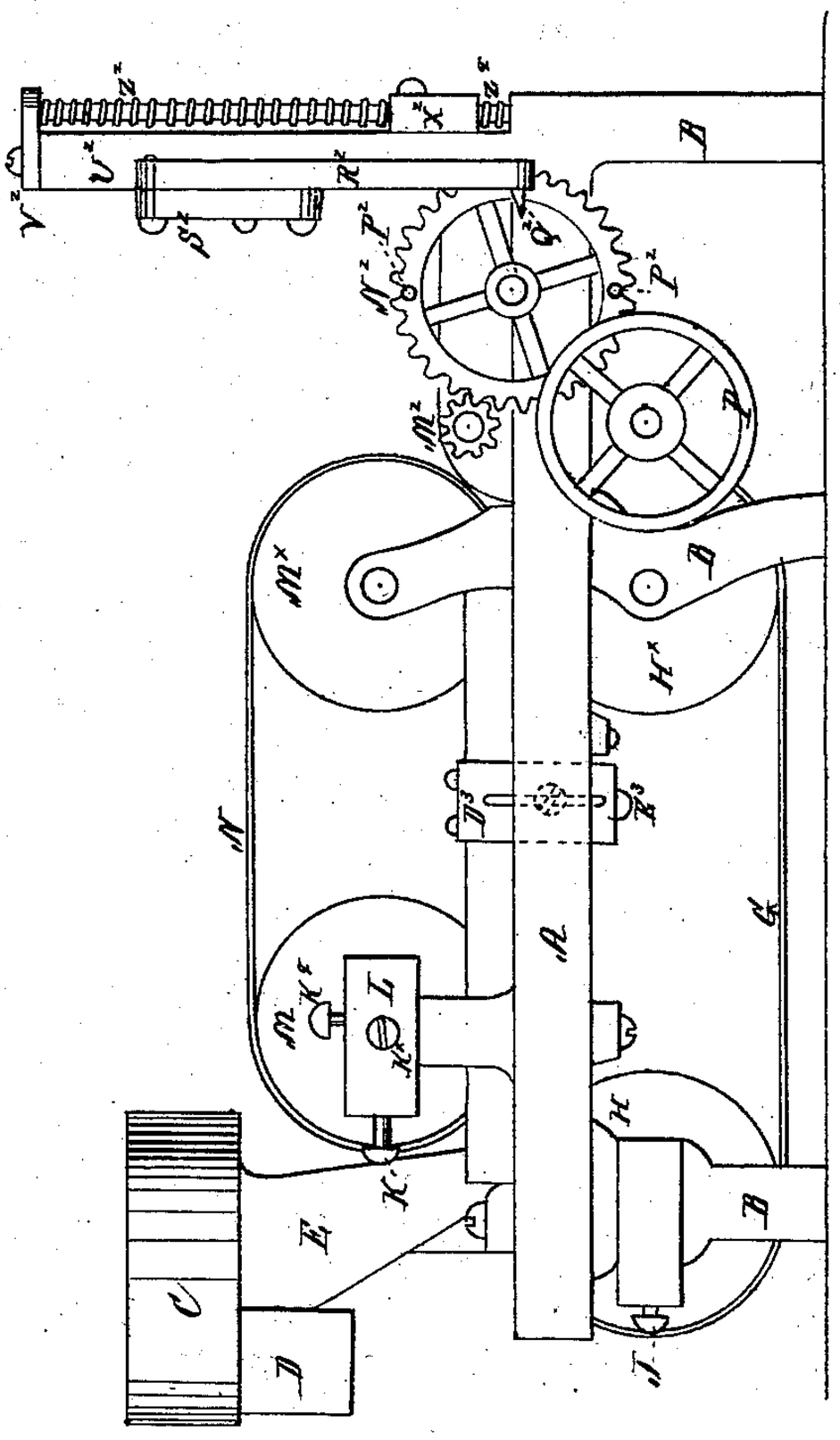

Fig. 2.

Witnesses,

Lemuel P. Dewey.

S. Davis

Inventor,

John Goodale

THE GRAPHIC CO. PHOTO-LITH. 39 & 41 PARK PLACE, N.Y.

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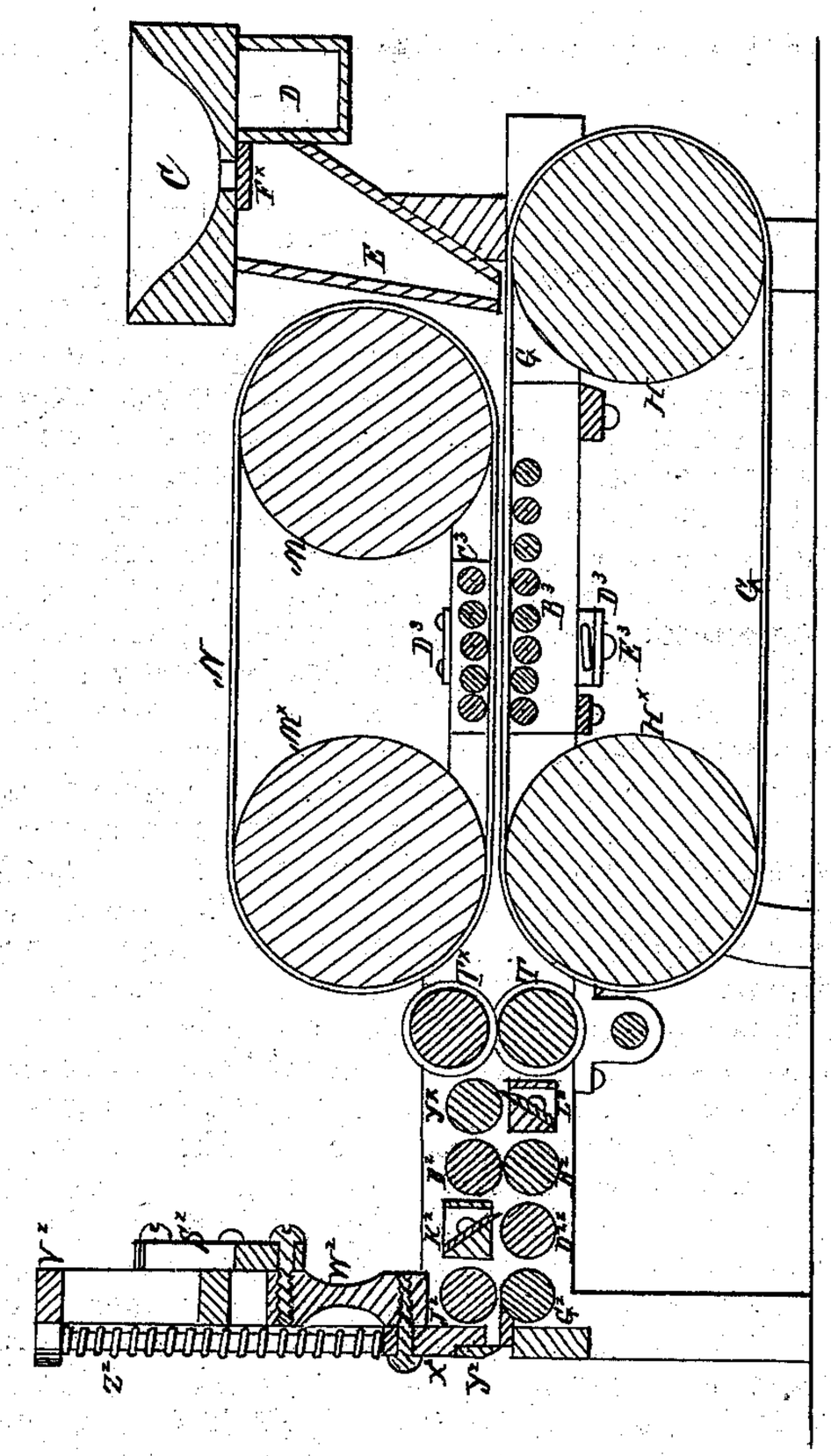
Fig. 3.



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Lemuel. P. Deuks.

S. Davis.

Inventor,

John Goodale

THE GRAPHIC CO. PHOTO-LITH. 39 & 41 PARK PLACE, N.Y.

UNITED STATES PATENT OFFICE.

JOHN GOODALE, OF NORTH CAMBRIDGE, ASSIGNOR TO LORENZO M. DYER, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN MACHINES FOR CASTING PRINTERS' LEADS.

Specification forming part of Letters Patent No. **155,609**, dated October 6, 1874; application filed May 22, 1874.

To all whom it may concern:

Be it known that I, JOHN GOODALE, of North Cambridge, Middlesex county, State of Massachusetts, have invented an Improvement in Machines for Casting Printers' Leads, of which the following is a description:

The nature of my invention is that of a combination of machinery by which molten type-metal is poured onto a flexible revolving belt of metal and pressed down by a similar belt above, being thus, when solidified, formed into a thin sheet, which, by an appropriate device, is cut into a number of strips, which are then planed or smoothed on the upper and under surfaces, and then cut into the desired lengths; and the object is the manufacture of printers' leads.

Figure 1 is a view from one side of the machine in perspective. Fig. 2 is a view from the other side, being a vertical elevation. Fig. 3 is a vertical section lengthwise.

In the drawings, A, Fig. 2, is one side of a frame (A^x in Fig. 1 is the opposite side) in the shape of a parallelogram when seen from above. B B B, Fig. 2, are three (of six) legs supporting the frame. C, Figs. 1, 2, and 3, is a melting-pot, holding the type-metal, and heated by means of the furnace D, which is supported by the frame at one end of it. E, Figs. 1, 2, and 3, is a spout, which conveys the melted metal down to the other portion of the machine. F, Fig. 1, is the handle to a lever attached to the bottom of the melting-pot C, the inner end of which lever F^x, Fig. 3, covers an aperture (seen in Fig. 1) in the center of the bottom of the melting-pot C, by which the aperture is opened or closed at pleasure, to permit or prevent the passage of the molten metal from the melting-pot. G G, Figs. 1 and 3, is a thin, flexible, endless band of steel, called the lower band, borne by the two lower-band drums H H^x, Figs. 1, 2, and 3, supported by bearings attached to two pairs of the legs of the frame. The two boxes carrying the shaft ends of the lower-band drum H are seen in Figs. 1 and 2 to be so fitted to the respective legs of the frame which bears them as that they can be made to slide back and forward horizontally by means, respectively, of the set-screws J J, Fig. 1, J, Fig. 2. A similar arrangement is seen in the drawings of a pair of sliding boxes, L, Fig. 1, L, Fig. 2, sliding back and forward by means of the pair of set-screws K, Fig. 1, K, Fig. 2, (and kept in place by the two side screws K^x, and lifted and lowered by the top screws K^9 K^9, Figs. 1 and 2,) upon the tops of uprights projecting perpendicularly from the upper surfaces of the two sides, respectively, of the frame A A^x. These two boxes L L bear the shaft ends of a drum, M, Figs. 1, 2, and 3, one of a pair, called the upper-band drums, which drum bears a second thin, flexible endless band of steel, N, Figs. 1, 2, and 3, called the upper band. The band is also borne by a second drum, M^x, Figs. 1, 2, and 3, which is borne in a similar manner on the top of two perpendicular projections from the frame A A^x. A pulley, P, is seen in Fig. 2, which pulley communicates motive power to the whole machine, and is borne by a shaft held by two downward projections from the under surfaces of the sides of the frame A A^x. This shaft bears at its other end the cog-wheel Q, Fig. 1, which actuates fifteen cog-wheels, all seen in Fig. 1, and borne by the frame A A^x. This cog-wheel Q gears into the cog-wheel R, which is borne by the shaft which carries one of the lower-band drums H^x, which drum is by this means rotated. The friction of the lower band G G rotates the other lower-band drum H. The upper side of the cog-wheel Q gears into the cog-wheel S, borne by a shaft which carries the lower one, T, Fig. 3, of a pair of ordinary slitting-rollers. Its mate, T^x, is also seen in Fig. 3, and is actuated by means of the cog-wheel U, Fig. 1. V, Fig. 1, is an intermediate cog-wheel, actuated by the wheel U, and actuating the large cog-wheel W, Fig. 1, borne by the shaft which carries the upper-band drum M^x, which drum is thus rotated. The friction of the upper steel band N rotates the other upper-band drum M. The wheel U also actuates the intermediate cog-wheel X, Fig. 1, which moves the cog-wheel Y, Fig. 1, thus rotating a roller, Y^x, Figs. 1 and 3, borne on the shaft of the wheel Y, and passing, parallel with the slitting-rollers, across the space between the sides of the frame A A^x. The cog-wheel S also actuates the intermediate cog-wheel Z, Fig. 1, through which is rotated the pair of

cog-wheels A^z A^z, borne, respectively, by a shaft, which pair of shafts carry, respectively, a roller, the upper one of which is seen in Fig. 1, marked B^z, and both in section in Fig. 3, marked B^z B^z. The lower cog-wheel A^z also actuates the intermediate cog-wheel C^z, which rotates the cog-wheel D^z, Fig. 1, and the roller borne on it, D^{zz}, Fig. 3. E^z, Fig. 1, is an intermediate cog-wheel, actuated by the wheel D^z, and actuating the cog-wheel F^z, Fig. 1, and thus rotating the pair of rollers—one, marked G^z, the lower, borne on the same shaft with the wheel F^z, and seen in section in Fig. 3. The wheel F^z rotates the cog-wheel H^z, Fig. 1, and thus also the upper one of the pair of rollers referred to, borne on the same shaft with the wheel H^z, and marked J^z in Figs. 1 and 3. K^z, Figs. 1 and 3, is a steel blade, called the upper trimmer, held in a narrow trough or frame, which passes from side to side of the frame A A^x, at right angles to its course, which trough is seen in Fig. 1 to be in the shape of a parallelogram, as seen from above, and is supported by its ends being attached to the inner surfaces of the long sides of the frame A A^x. The shape of this blade-bearing trough, seen in section in Fig. 3, causes the blade K^z to be held inclined at an angle of forty-five degrees downward, in a direction toward the two steel belts before described. A set-screw, seen in Figs. 1 and 3, serves to hold the blade K^z firmly in position. L^z, seen only in section in Fig. 3, is a similar arrangement of trough, blade, (called the lower trimmer,) and screw, in which the blade inclines upward toward the belts at an angle of forty-five degrees. In Fig. 2 is seen, at M^z, a small cog-wheel, borne by the shaft which carries the upper slitting-roller T^x, Fig. 3, which cog-wheel gears into another larger cog-wheel, N^z, Figs. 1 and 2, supported by the frame A A^x. This wheel N^z carries, near its periphery, two short projections or pegs, P^z P^z, on opposite sides of the wheel, and parallel with the axis of the same. Q^z, Fig. 2, is a short peg, whose upper side is chamfered, held at right angles to it by an arm, R^z, Figs. 1 and 2, which arm hangs loosely from one end (the hither end, in Fig. 2) of a lever, S^z, Figs. 1 and 2, borne by a stationary bar, T^z, Fig. 1, which connects two upright standards, U^z U^z, Fig. 1, (U^z, Fig. 2,) attached, as seen in Fig. 1, to one end of the frame A A^x. The tops of these standards are connected by a cross-piece, V^z, Figs. 1 and 2. The other end of the lever S^z bears, loosely attached to it by a rivet, an arm, W^z, Fig. 1, the lower end of which arm is loosely attached, by a rivet, to the blade cross-piece X^z, Figs. 1, 2, and 3, which latter carries a blade, Y^z, Fig. 3, whose cutting-edge is downward. (Seen in section in Fig. 3.) This blade cross-piece moves up and down upon two perpendicular rods, Figs. 1, 2, and 3, held by the top cross-piece V^z, and, at their lower ends, by the ends of the long sides of the frame A A^x. These rods are surrounded above the blade-piece X^z by spiral springs, seen in Figs. 1, 2, and 3, the lower ends of which press upon the upper edge of the blade cross-piece X^z. Below the blade cross-piece are two other spiral springs—one, marked Z^9, is seen in Fig. 2, disposed round the rods Z^z, whose function is to press up the blade cross-piece X^z. A^3 A^3, Fig. 1, are two slabs of metal, called the guides, placed on their edges, and lying inside the frame A A^x, and parallel with its sides. Between them passes the upper portion of the lower steel belt G G. The guides bear, at the point marked B^3 in Fig. 3, eight small rollers, seen only in section in Fig. 3, whose axes are parallel with those of the band-drums. C^3 C^3, Fig. 1, (C^3, Fig. 3,) is a small frame, sliding up and down between the slabs A^3 A^3, being held in position by a pair of clamps—one, D^3, seen in Fig. 1, and one, D^3, in Fig. 2, the top and bottom of one being seen in Fig. 3, marked D^3 D^3; which clamps are attached at their tops to the frame C^3 C^3, pass down outside the slabs A^3 A^3, and, then bending, pass horizontally beneath the same, and then, by means of an aperture in each of them, respectively, receive each a set-screw, E^3, Figs. 2 and 3, screwed into the lower side of the guides or slabs A^3 A^3, respectively; which pair of set-screws bear, respectively, a spiral spring (one seen in section in Fig. 3) between the horizontally bent portion of the clamps and the lower surface or edges of the slabs A^3 A^3.

The type-metal is put into the melting-pot C, and melted by the fire in the furnace D. By movement of the lever F, the molten metal is admitted through the aperture in the bottom of the melting-pot into the spout E, through which it passes down upon the lower steel band G, which—the pulley P, Fig. 2, being put in motion—is moving over its two drums, the upper portion passing in a direction from the melting-pot. The molten metal thus received on the lower belt is kept from running off at the side of the belt by the guides A^3 A^3, and, as the belt moves, is carried beneath the lower portion of the upper steel belt N, Fig. 1. By means of the eight rollers at B^3, Fig. 3, the lower belt is held up and kept in place, so as to present a plane surface. The lower portion of the upper belt N (which belt is also in motion) is held down, and a plane surface is secured, by the five rollers at C^3, Fig. 3. To thicken the proposed leads, the set-screws E^3, Figs. 2 and 3, are screwed in, thus lifting the frame C^3 C^3, Fig. 1. The rollers are enabled to yield slightly by means of the pair of spiral springs, one of which is seen in Fig. 3. By the time the molten metal has passed on the belt beyond the small rollers it has solidified, and presents the form of a thin broad sheet, which passes between the pair of slitting-rollers T T^x, Fig. 3, and is by them cut into narrow strips—four, more or less—which pass between the roller Y^x, Fig. 4, and the lower trimmer-blade L^z, Fig. 3, and thence between the drawing-rollers B^z B^z, Fig. 3, which draw it against the edge of the trimmer-blade, which

planes smooth the lower surface of the leads. The leads then pass under the upper trimmer-blade K^z, and above the roller D^{zz}, Fig. 3, to the drawing-rollers J^z G^z, by the joint action of which the upper surface of the leads is planed smooth. The leads are then in the shape of a continuous strip of type-metal, and they pass on, by the action of the drawing-rollers J^z G^z, to a point under the blade Y^z, Fig. 3. The rotation (see Fig. 2) of the wheel N^2 brings successively the pegs P^z P^z in contact with the chamfered peg Q^z, forcing it down as long as it is in the line of rotation of the pegs P^z P^z, and thus drawing down the bar R^z and one end of the lever S^z. The blade-piece X^z and the blade Y^z are thus permitted to be raised by the springs Z^9, Fig. 2, thus permitting the passage of the type-metal strips. When the peg P^z quits the peg Q^z, the spiral springs (seen in all the three drawings) round the upright rods Z^z drive down the blade Y^z, and thus cut off the leads to the required length. The pegs P^z P^z being, in practice, made movable on the wheel N^z, which bears them—changeable from hole to hole on the wheel—the length of the leads is thus graduated at pleasure. The pairs of set-screws J J and K K, Fig. 1, are useful for tightening the steel belts.

I sometimes dispense with some of the upper and under belt supporting and pressing rollers; and I sometimes dispense with my upper steel belt, using a simple roller instead thereof; and I can dispense with the slitting-rollers. I do not always place my melting-pot and heating apparatus upon the frame A A^x.

I do not claim the combination of movable belts for forming molten metal into shape; nor do I claim the tightening of the belts by means of screws; but

I claim—

1. The combination of the melting-pot and heating apparatus, the guides, and the lower steel belt, with the small rollers borne by the guides above and below the belt, with the slitting-rollers, all substantially as described.

2. The combination of the melting-pot and heating apparatus, the guides, and the lower steel belt, with the small rollers borne by the guides above and below the belt, with the stationary blades L^z and K^z and the two pairs of drawing-rollers, all substantially as described.

3. The combination of the melting-pot and heating apparatus, the guides, and the lower steel belt, with the small rollers borne by the guides above and below the belt, with one or more pairs of drawing-rollers and the cutting-off blade Y^z with its actuating apparatus, all substantially as described.

4. The combination of the melting-pot and heating apparatus, the guides, the moving belts and the intermediate rollers, the slitting-rollers, and the planing-blades, with their pressing-down and drawing rollers, and the cutting-off blade and attachments, all substantially as described.

JOHN GOODALE.

Witnesses:
LEMUEL P. JENKS,
S. DAVIS.