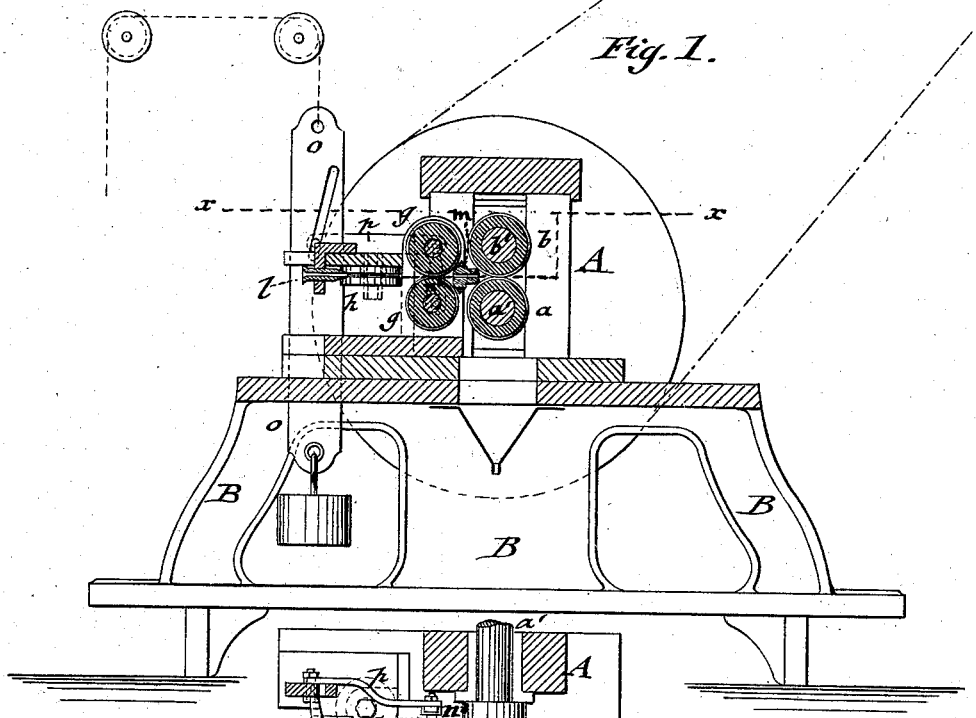
(No Model.) 2 Sheets—Sheet 1.

T. KUHNE.

MACHINE FOR ROLLING AND REELING WIRE.

No. 261,934 Patented Aug. 1, 1882.

Fig. 1.



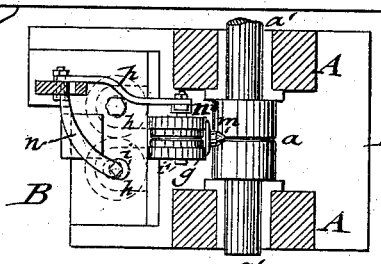


Fig. 2.

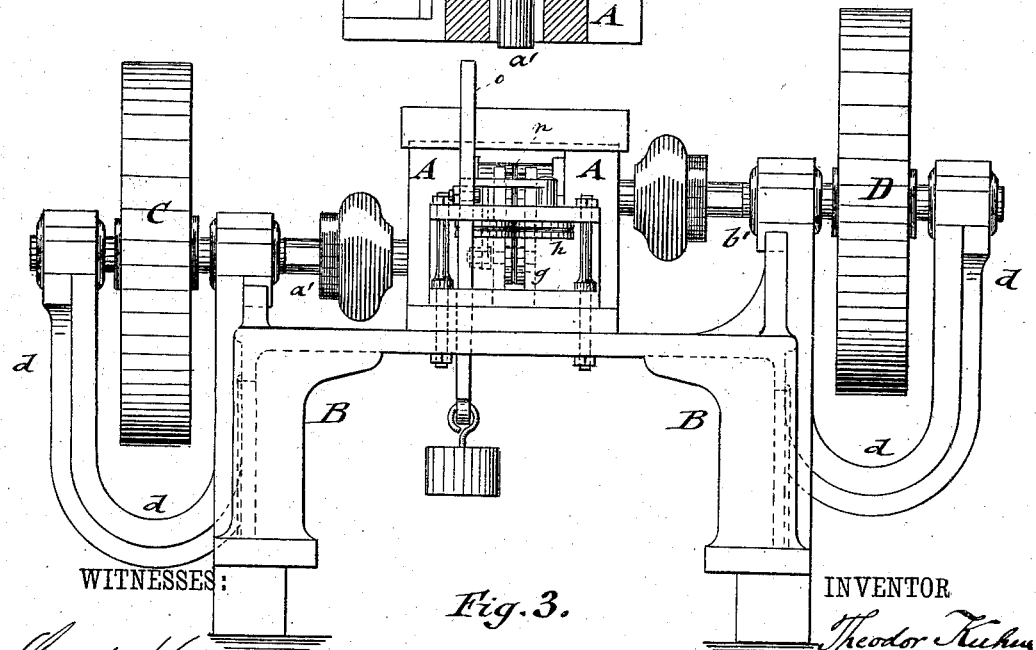


Fig. 3.

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(No Model.) 2 Sheets—Sheet 2.

T. KUHNE.

MACHINE FOR ROLLING AND REELING WIRE.

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Fig. 10.

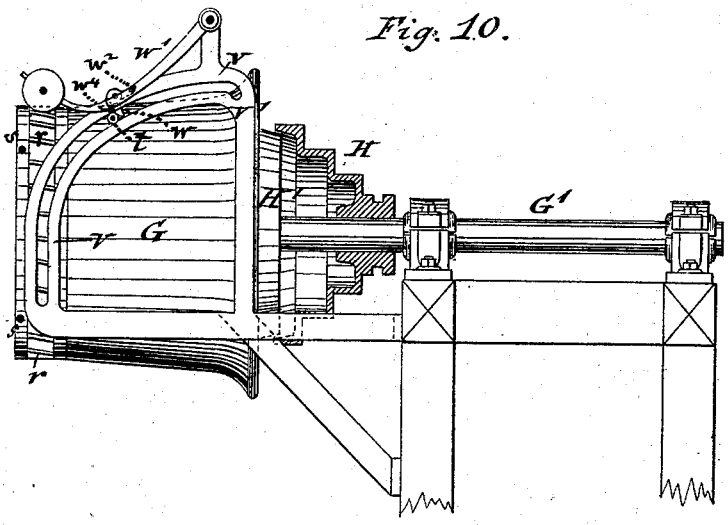


Fig. 12.

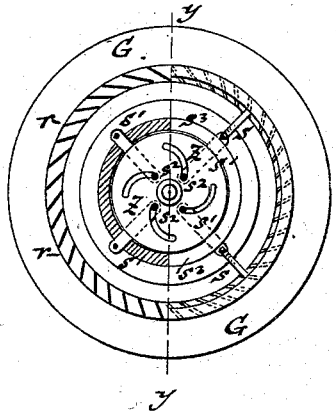


Fig. 11.

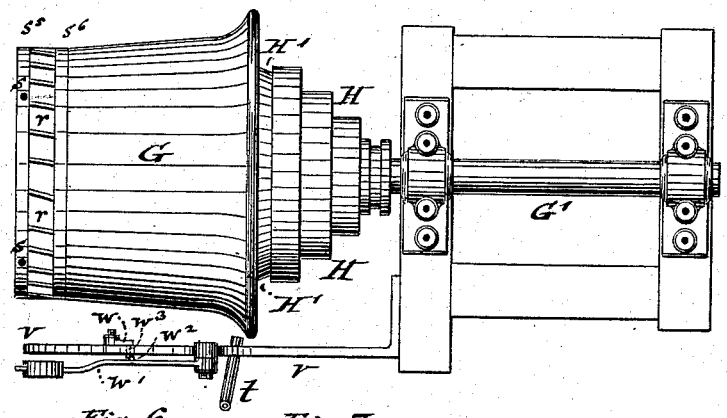


Fig. 13.

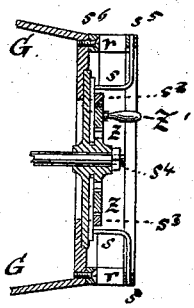


Fig. 6.

Fig. 7.

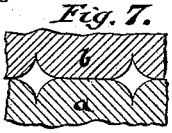


Fig. 4.

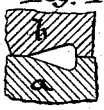
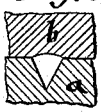


Fig. 5.



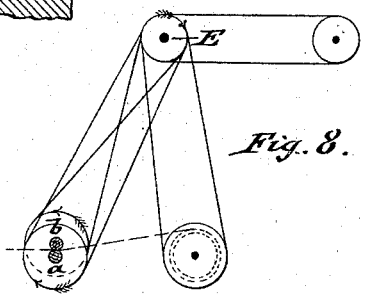


Fig. 8.

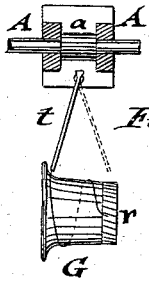


Fig. 9.

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UNITED STATES PATENT OFFICE.

THEODOR KUHNE, OF SCHWELM, PRUSSIA, GERMANY.

MACHINE FOR ROLLING AND REELING WIRE.

SPECIFICATION forming part of Letters Patent No. 261,934, dated August 1, 1882.

Application filed November 3, 1881. (No model.)

To all whom it may concern:

Be it known that I, THEODOR KUHNE, of the city of Schwelm, in the Kingdom of Prussia, German Empire, have invented Improvements in Wire Rolling and Winding Machines, of which the following is a specification.

This invention relates to improvements in the wire-rolling machine for which Letters Patent of the United States have been granted to Julius Schmidt, numbered 240,190, and dated April 12, 1881, the improvements being designed to draw wire of any cross-section in a cold state and wind up the same immediately after rolling.

The invention consists, first, in the employment of peculiarly-grooved drawing-rolls for triangularly and rectangularly shaped wires; secondly, in revolving the drawing-rolls in place of gear-wheels, as heretofore, by means of separate shafts, pulleys, and belts for each roll; thirdly, in the combination, with the drawing-rolls (one or more) of sets of guide-rolls and fixed guide-tubes; fourthly, in the combination, with the drawing-rolls, of a mechanism for automatically winding up the wire as it leaves the drawing-rolls. These and other features of my invention will be fully understood from the following description, when taken in connection with the annexed drawings.

In the accompanying drawings, which fully represent my invention, Figure 1 represents a vertical longitudinal section of my wire-rolling machine; Fig. 3 is an end elevation of the same; Fig. 2 is a horizontal section of the same on line *x x*, Fig. 1. Figs. 4, 5, 6, and 7 are detail sections of drawing-rolls with grooves for forming wires of triangular and rectangular cross-section. Fig. 8 is a diagram of the pulleys and belts by which independent motion is imparted to each drawing-roll. Fig. 9 is a diagram showing the connection of the wire-rolling machine with the winding-up mechanism; and Figs. 10, 11, 12, and 13 are respectively a partly-sectional side elevation, a plan view, a sectional end view, and a detail vertical transverse section on line *y y*, Fig. 12, of my improved automatic winding-up attachment used in connection with the wire-rolling machine.

Similar letters of reference indicate corresponding parts.

A in the drawings represents the standards, which support the drawing-rolls *a b*. The standards A are secured to a bed-frame, B, which is arranged at opposite sides with U-shaped supports, which are guided in grooves of the bed-frame, so as to be vertically adjustable thereon. The shafts *a' b'* of the drawing-rolls are extended in opposite directions to each other, and revolved in bearings at the upper ends of the supports *d d*, the shafts being provided with pulleys C and D, which receive their motion, respectively, by a straight and crossed belt from a counter-shaft, E, as shown in Fig. 8. The drawing-rolls *a b* are provided with circumferential grooves or channels, which are made of angular or curved shape, according to the cross-section to be imparted to the wire. If wire of a triangular cross-section is to be drawn, the wire is first passed through a set of drawing-rolls having grooves, as shown in Figs. 4 and 5, the grooves being in one case of equal size, while in the other case the roll *a* is grooved for the apex and the roll *b* for the convexly-curved base of a triangle. The wire is then passed through a second set of rolls, which is grooved, as shown in Fig. 6, the lower roll forming two sides and the upper roll the third side of the triangular wire. In this set of rolls the pointed rings formed between the grooves of the lower roll enter and mesh with narrow guide-grooves of the upper roll *b*. By means of these drawing-rolls triangular wires with straight or channeled sides may be produced. If wire with a rectangular cross-section is to be drawn, drawing-rolls with angular grooves of equal size are used, as shown in Fig. 7. Any number of grooves may be arranged sidewise of each other in the drawing-rolls *a* and *b*.

In front of the drawing-rolls *a* and *b* is arranged the mechanism for guiding the wire to the rolls. This guiding mechanism consists of two sets of rolls, *g* and *h*, which are used in connection with two fixed guide-tubes, *l* and *m*, of which the latter is placed immediately in front of the drawing-rolls, while the former is placed in front of the first set of guide-rolls *h*, as shown clearly in Figs. 1 and 2. The shafts of the guide-rolls *g* are arranged in horizontal position, while those of the second set of guide-

rolls *h* are placed vertical, so that the planes of the guide-rolls are disposed at right angles to each other. The circumferences of the guide-rolls are grooved so as to correspond in shape to the cross-section of the wire to be fed to the drawing-rolls, by which the accurate guiding of the wire to the drawing-rolls *a b* is obtained. The shafts of the guide-rolls *g* and *h* are so supported in their bearings that one roll of each set may be approached or moved away from the other, which is necessary for the introduction of the wire to the rolls. For this purpose the shaft of one roll of each set is supported eccentrically in its bearings, so that by turning the shaft *i'* of the upper roll *g* or the shaft *i* of the lower roll *h* these rolls are either approached to or carried away, respectively, from the lower roll *g* and the upper roll *h*. This is accomplished by attaching to the ends of the shafts *i* and *i'* the levers *n* and *n'*, of which the end of the lever *n* is guided in an inclined slot of the vertical slide-piece *o*, while the end of the lever *n'* is connected in similar manner by a rod, *p*, and a guide-block with the slot of the slide-piece *o*. This slide-piece *o* is carried in downward direction by means of a weight attached to its lower end, so that thereby the rolls *g* and *h* are moved toward each other, taking thereby securely hold of the wire. The slide-piece *o* is raised by means of a wire rope, (shown in dotted line in Fig. 1,) said rope being passed over guide-pulleys to a treadle, by depressing which one roll of each set of guide-rolls is carried away from the other roll of the set, so as to admit the introduction of the wire between them. When it is desired to simplify the construction of the machine one of the guide-rolls *g* or *h* may be omitted. After the wire has passed through the drawing-rolls *a b* it is taken up by an oscillating tube, *t*, (shown in Fig. 9,) and delivered to the automatic winding-up attachment, which is shown in detail in Figs. 10, 11, 12, and 13. The main part of the winding-up attachment is a conically-tapering drum, G, which is arranged either horizontally or vertically, and which is provided at one end with fixed obliquely-arranged wings *r*, that serve for taking hold of and retaining the wire to be wound up. The oblique wings *r* are clearly shown in Figs. 11 and 12, and are arranged at an angle of inclination to the circumference of the drum G, so that when the end of the wire is delivered by the tube *t* into the space between two adjoining wings it is taken hold of and drawn through the tube. This is the initial operation to winding the wire on the drum G.

The end of the tube *t* terminates in a curved and slotted supporting-frame, *v*, arranged in front of the drum G, as shown in Figs. 10 and 11. The slotted frame *v* serves for guiding the wire toward the larger end of the drum. At the beginning of the winding-up operation the end of the wire, as soon as it leaves the tube *t*, is taken up by the wings *r*, and wound up by the rotation of the drum G, as shown clearly in Fig. 9. The end of the tube *t* will thereby be compelled to follow the wire, it being moved in upward direction along the curved slot of frame *v* until it lifts a latch, *w*, whereby a curved and weighted lever, *w'*, is caused to act upon the tube *t*, so as to move it along in the upper horizontal part of the curved slot. The lever *w'* is held in the position shown in the drawings in Figs. 10 and 11 by a pin, w^2, which rests upon a pin, w^3, of the bell-crank-shaped notch *w*. The latter is retained in this position by means of a stop-pin, w^4. (Shown in Fig. 10.) As soon as the conduit-tube *t* has arrived in the position shown in Fig. 10, and begins to move farther toward the right, the latch *w* releases, by means of the pin w^3, the pin w^2, and causes the dropping of lever *w'*, which will then press upon the tube *t* and compel the same, by means of its weight, to move forward in the slot of the frame *v* until it arrives at the notch *v'*, where it is retained and prevented from moving in backward direction. The object of the slotted guide-frame *v* is to lead the conducting-tube *t* from that end of the drum G arranged with the wings *r* to the larger end of said drum. The conducting-tube is then held stationary throughout the entire winding operation, and is returned by the operator to the lowest end of the slotted guide-frame after a roll has been wound up and removed from the drum.

Motion is imparted to the drum G by means of a cone-pulley, H, in connection with a friction-coupling, H', by means of which a uniform speed between the winding-up mechanism and the rolling-machine is obtained. The drum G is keyed fast to its shaft G', while the cone-pulley H is placed loosely thereon, and thrown by the usual appliances in and out of gear. The shaft G' turns in bearings which are supported on a substantial wooden or other frame, as shown in Figs. 10 and 11. The wire from the drawing-rolls of the rolling-machine is delivered by the conduit-tube *t* to the oblique wings, which take hold of the wire and draw it in a spiral convolution around the drum, the wire forcing the conduit-tube *t* along the slotted guide-frame *v* up to the notch *v'*, where it remains throughout the following winding operation. It is then wound up around the larger end of the drum G, being then compelled, partly by the conical shape of the drum and partly by the action of each following convolution of the wire, to move toward the left end of the drum, where it is stopped by radially-projecting pins *s*, (shown in Figs. 12 and 13,) which retain the wound-up wire. These pins *s* are adapted to be drawn inwardly, so as to permit the removal of the wire roll after the winding-up operation is completed. For this purpose the pins *s* are riveted onto interior radial slide-pieces, *s'*, which latter engage, by pins s^2 at their inner ends, curved slots of a disk Z. This disk turns loosely on the shaft of the drum, and is retained by the nut s^4.

It is obvious that by turning the disk Z toward the right (shown in Fig. 12) by the handle Z′ the slide-pieces s' and the radial pins s are pushed in outward direction, while by the turning of the disk Z in opposite direction they are drawn in below the peripheral surface of the drum. The radial pins s are guided in slots of an exterior ring, s^5, while the radial slide-pieces s' are guided in slots of a fixed interior ring, s^3. Between the outer ring, s^5, and a second ring, s^6, are arranged the oblique wings r, as shown clearly in Figs. 11 and 13. The entire ring or circle of wings r is attached to the end wall of the drum by the ring s^6, as shown clearly in Fig. 13. After the wire is made into a roll and this roll is removed from the drum G the conducting-tube t is returned by the operator to the lower part of the slotted guide-frame, so as to deliver there the end of the wire again to the wings of the drum to form another roll, after which the same operation of winding is repeated.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, in a wire-rolling machine, with the drawing-rolls a b, of one or more sets of guide-rolls, g h, of which one roll of each set has an eccentric shaft, levers n n' applied to said shafts, slotted slide-piece o, and means for raising and lowering said slide-piece, so as to raise or lower one roll of each set of guide-rolls for introducing the wire, substantially as set forth.

2. The combination, in a wire-rolling machine, of intermediate oscillating conduit-tube, winding-up drum, having curved and slotted guide-frame for the conduit-tube, the latch, and the weighted lever, whereby the tube is carried up and retained at the larger end of the drum, substantially as set forth.

3. In a wire rolling and winding machine, a conically-tapering winding-drum, G, having obliquely-arranged wings r around the smaller end of the drum for taking hold of the end of the wire, as described.

4. In a wire rolling and winding machine, the combination of the conically-tapering drum G with radially-sliding pins s, slide-pieces s', pins s^2, and disk Z, whereby they can be thrown outside or drawn back into the drum, so as to remove the wire roll, as set forth.

5. The combination of the drawing-rolls a b, one or more sets of guide-rolls, g and h, fixed guide-tubes l and m, a conduit-tube, and a winding-drum, substantially as described.

6. The combination, with wire rolling and shaping devices, of a conducting-tube, a curved guide for this tube, provided with an arresting-notch therefor, and means for moving the tube from the smaller end of the winding-drum into said notch and leaving it there, substantially as described.

7. The combination of the drum G, oblique wings r, the stationary slotted guide-frame, the movable conduit-tube, the loaded arm w', and the devices w w^2 w^3, substantially as described.

8. The combination of the tapered winding-up drum, oblique wings r, radial pins s, and means for protruding these pins or retracting them, substantially as described.

9. A wire-winding drum of tapered form, having a flange on its larger end and a series of oblique wings, r, on its smaller end, in combination with means for guiding and directing the wire from a rolling-machine upon this drum, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

THEODOR KUHNE.

Witnesses:

GUSTAV POLSCHER,

EMIL TENNER.