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H. KELLOGG.

Metal Rolling Machines.

No. 133,451. Patented Nov. 26, 1872.

fig 1

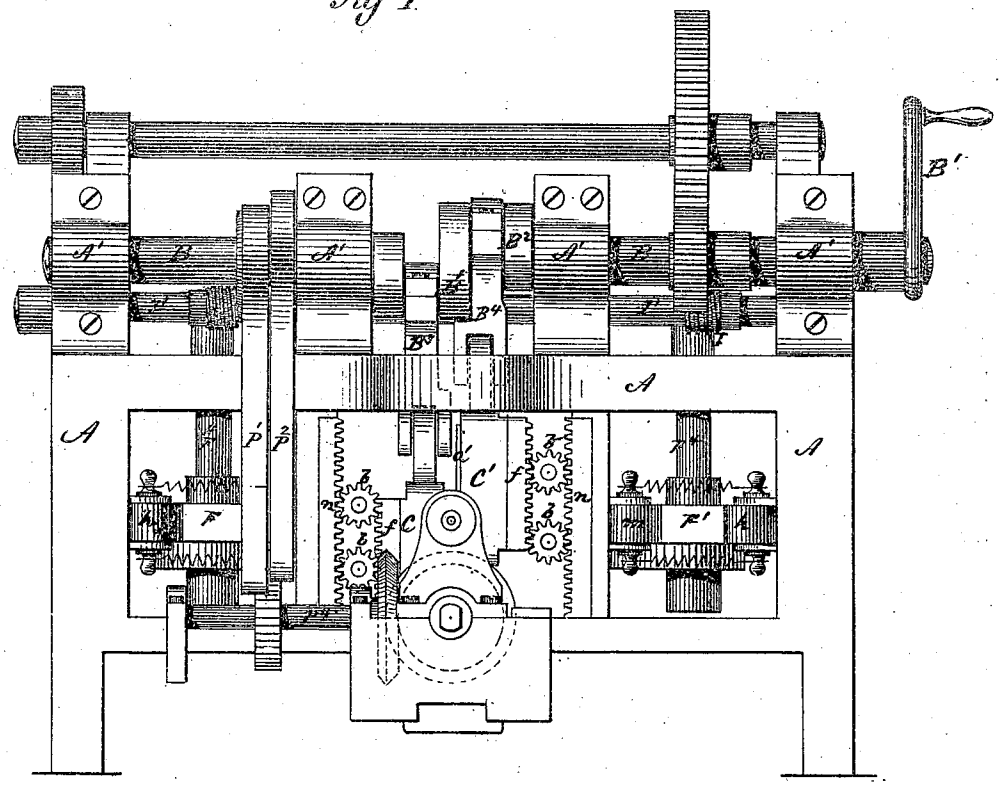
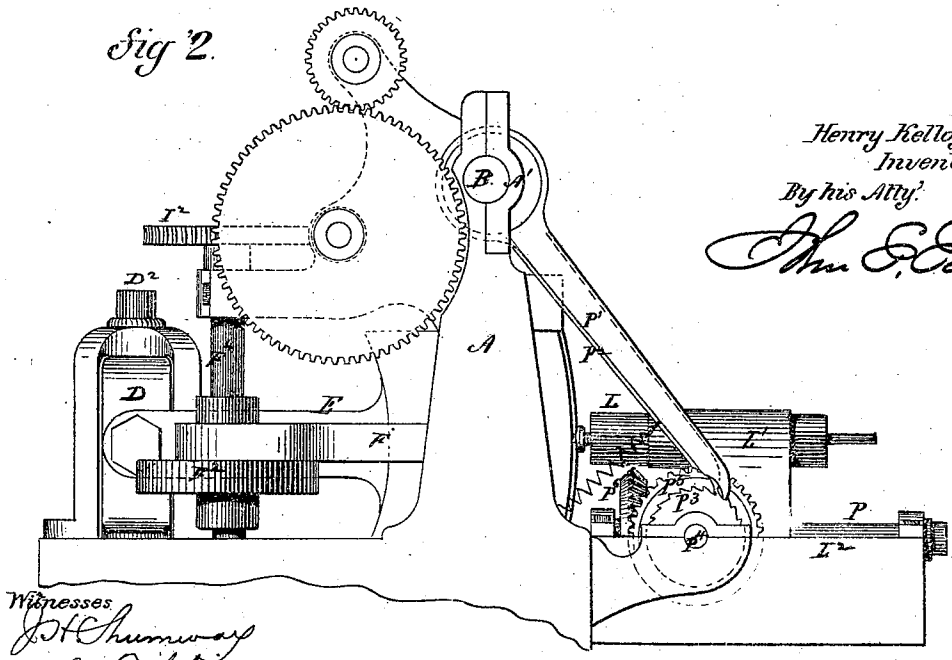


Fig 2.



Henry Kellogg
Inventor
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Witnesses.
J. H. Shumway
A. J. Tibbitts

2 Sheets--Sheet 2.

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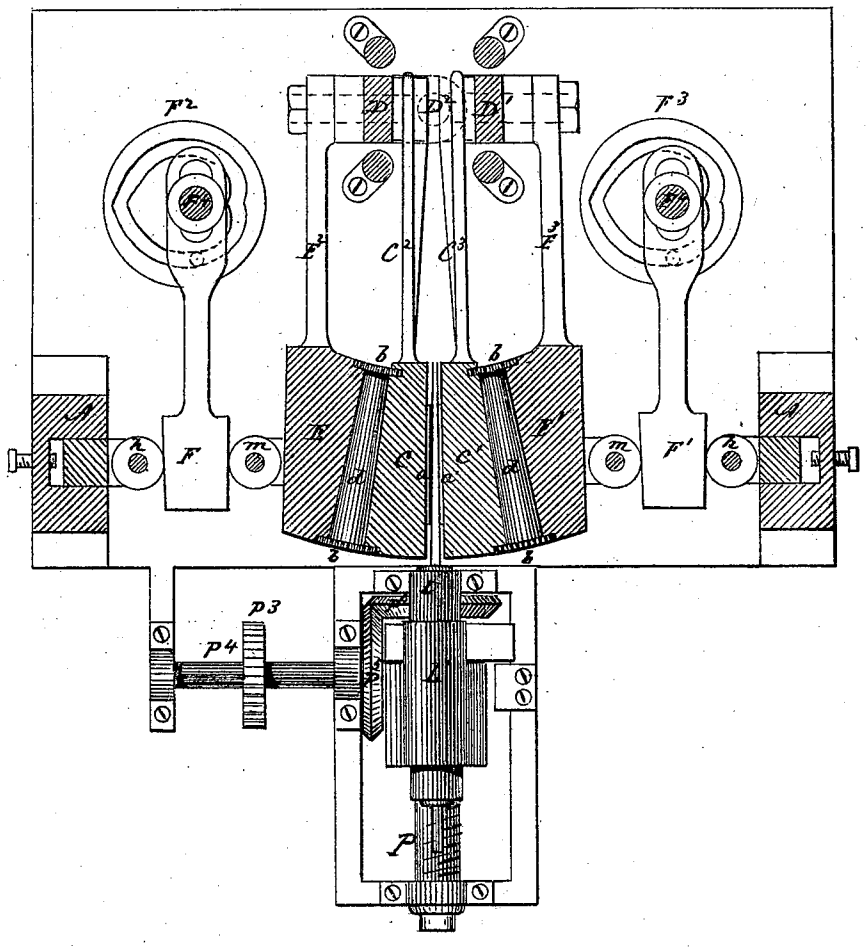
Fig. 3.



Witnesses.

J. H. Shumway

A. J. Tibbetts

Henry Kellogg
Inventor
By his Atty.
John P. Earle

UNITED STATES PATENT OFFICE.

HENRY KELLOGG, OF MILFORD, CONNECTICUT.

IMPROVEMENT IN METAL-ROLLING MACHINES.

Specification forming part of Letters Patent No. 133,451, dated November 26, 1872.

To all whom it may concern:

Be it known that I, HENRY KELLOGG, of Milford, in the county of New Haven and State of Connecticut, have invented a new Improvement in Machines for Rolling Tapers; and I do hereby declare the following, when taken in connection with the accompanying drawing and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawing constitutes part of this specification, and represents, in—

Figure 1, a front view; Fig. 2, an end view; and in Fig. 3, a top view.

This invention relates to the construction of a machine for rolling tapers, more especially designed for small diameters. In my application marked D, filed in even date herewith, I have represented a pair of reciprocating plates for rolling shafting or rods of an equal diameter. In my present application I embody a similar principle of reciprocating plates, but arranged for rolling taper forms.

This invention consists in the arrangement of a pair of adjustable flat plates, to which a reciprocating movement is imparted, these plates swinging from the center in an arc of a circle. The surfaces of the said plates radiating from the said center will, acting upon a blank placed between them, work the said blank into a taper form, which, if extended, would run to a point at the said center, its largest diameter being the outer edge of the said plates.

A is the frame of the machine, upon which, in suitable bearings A′, a driving-shaft, B, is arranged to be driven by the application of power thereto in any convenient manner, here, for convenience of illustration, represented as by a crank, B^1. C C^1 are two reciprocating carriages, upon the meeting-faces of which are arranged plates *a a′*, whose surfaces, vertically, are parallel to each other. These carriages C C^1 extend back in the form of arms C^2 C^3, and are hung upon a shaft arranged in independent frames D D^1, these frames arranged upon a common vertical center, D^2, as seen in Figs. 2 and 4, so that while the said carriages will move freely up and down, swinging upon the shaft in the frame D D^1, they may be turned from each other, constantly radiating from the said vertical point D^2. Outside the plates C C^1 are arranged bearings E E^1 for the support of the said carriages. These bearings, in like manner, by the arms E^2 E^3, extend back to the same shaft as their respective carriages, as seen in Fig. 3, and, in like manner, turned to the right and left upon the said center. To avoid friction between the carriages and their bearings, I arrange back of each carriage two or more rolls, *d*, as seen in Fig. 3. These rolls are tapering toward the same common center before described, so as to make the velocity or movement the same both in the front and rear, and so as to roll freely between the carriages and their respective bearings. To retain the said rolls in their proper relative position I apply to each end of the rolls a pinion, *d*, and to the corresponding edges of the carriage a rack, *f*, and a corresponding rack, *n*, to each of the bearings, as seen in Fig. 1. The pitch-line of the pinions and racks corresponds to the diameter of the rolls at that point, so that, the carriages moving as before described, the rolls revolve and work up and down between the carriages and their bearings, but always in a radial line from the same common center. In order to adjust the plates to a greater or less distance from each other, to produce a greater or less diameter, I arrange between each of the bearings E E′ and the frame A a wedge, F F^1, working to avoid friction between a roll, *h*, on the frame and roll *m* on the bearing, as seen in Fig. 3. These wedges are actuated by cams F^2 F^3 in the rear, the said cams arranged upon vertical shafts F^4, which said shafts are caused to revolve by worms I on a shaft, I^1, working in a toothed wheel, I^2, on the said shafts F^4, the said worms driven by intermediate gearing from the main shaft. As these wedges are forced forward the plates approach each other, and when drawn back the plates separate.

The said carriages are in connection with the driving-shaft B by means of cranks B^1 and B^2 and connecting-rods B^3 and B^4, as seen in Fig. 1; hence as the driving-shaft revolves a vertical reciprocating movement is imparted to each of the carriages carrying the plates, and the cranks are in opposite positions, so that as one plate rises the other descends, both always moving with the same velocity; therefore, starting with the wedges drawn back so as to open the plates to their fullest extent

and the parts of the machine which I have described being in connection, the plates reciprocate, and, by the turning of the cams F^2 and F^3 to force the wedges forward, the plates gradually but slowly approach each other; therefore, if a blank or rod be placed between the plates when first open, and allowed there to remain, it will be rolled between the plates until reduced in diameter corresponding to the distance between the two plates. The rod so introduced should be in a line radiating from the same common center before described; hence, as the plates move in opposite directions with equal velocity, the rod will roll between the plates, but will not change its axial position. To thus introduce the rod, I arrange a mandrel, L, in a carriage, L^1, which moves in guides L^2 to and from the plates, the axial line of the said mandrel being radial from the before-mentioned common center. A leading-screw, P, in connection with the carriage L^1, is caused to revolve by means of two pawls, P^1 P^2, actuated by eccentrics on the driving-shaft. Their movements, corresponding, respectively, to that of the cranks B^1 B^2, act upon a ratchet, P^3, on a shaft, P^4, which shaft carries a bevel-gear, P^5, working into a corresponding gear, P^6, on the leading-screw P. Thus is imparted to the leading-screw a movement timed to correspond to the movement of the plates. The blank to be rolled is secured in the mandrel and inserted between the reciprocating plates, and there held until rolled down to the diameter required, the cams F^2 F^3 acting, as before described, to press the plates together. When the required diameter is attained the action of the cams F^2 F^3 is reversed, the plates opened, the mandrel withdrawn, and a new blank introduced.

In this operation the feeding device is not essential; but for drawing down, a blank is introduced of sufficient length to extend beyond the inner edge of the plates, as denoted in broken lines, Fig. 3, this extension being sufficient for the drawing down required. Thus inserted, and all the parts operating, the blank is gradually withdrawn as the plates approach each other, the rear edge of the plates rolling down and drawing out that portion of the blank which extends beyond their edge until the length and tapered diameter are attained, then the plates are opened, the rolled article removed, and a new one inserted.

This last plan—that is, of drawing down—is believed to be the best, and less liable to cause the metal to flake than the rolling of the blank without feeding.

If desirable, a noduled or botryoidal surface, as described in my application B for a similar invention filed in even date herewith, may be given to the rolling surface.

I claim as my invention—

1. A pair of reciprocating carriages, C C^1, each provided with plates or working surfaces vertically parallel to each other, and transversely inclined to a common center, upon which common center the said carriages are hung, to each of which a reverse reciprocating movement is imparted, and provided with a mechanism, substantially such as described, to cause the said working surfaces or carriages to gradually approach each other to roll the blank placed between them into a tapering form, substantially as described.

2. In combination with the subject-matter of the first clause of claims, I claim a mandrel, L, arranged relatively to the said plates to hold and support the blank or rod being rolled, substantially as specified.

3. In combination with the subject-matter of the first clause of claims, I claim the feeding device, substantially such as described, carrying the said mandrel L, and to which a retreating movement is imparted, timed in its movement relatively to the movement of the plates, substantially as set forth.

HENRY KELLOGG.

Witnesses:
J. H. SHUMWAY,
A. J. TIBBITS.