(No Model.) 3 Sheets—Sheet 1.

C. B. ANDREWS.

MILL FOR ROLLING TAPERS.

No. 517,322. Patented Mar. 27, 1894.

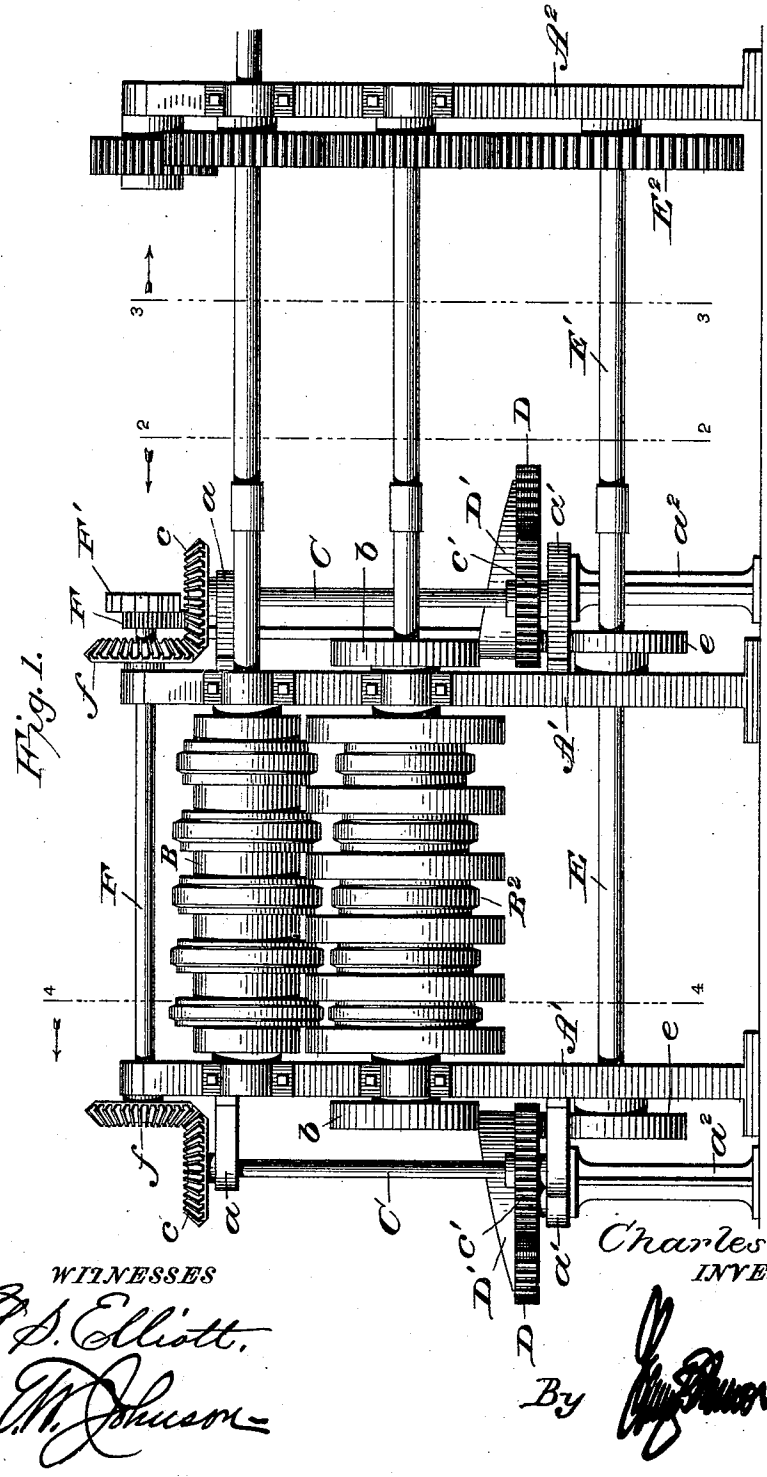

Fig. 1.

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Fig. 3.

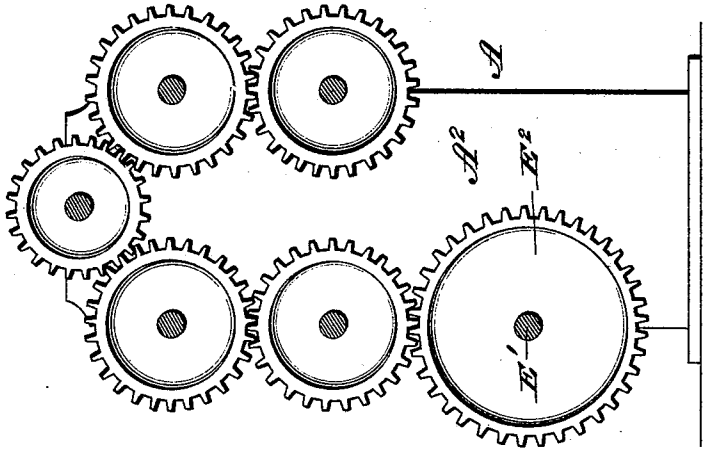

Fig. 2.

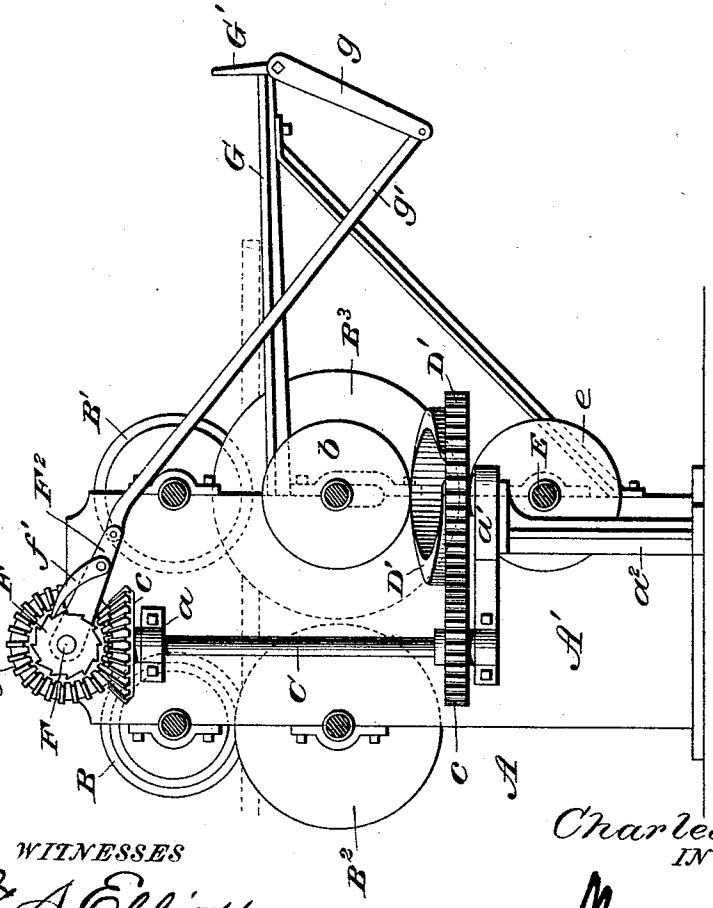

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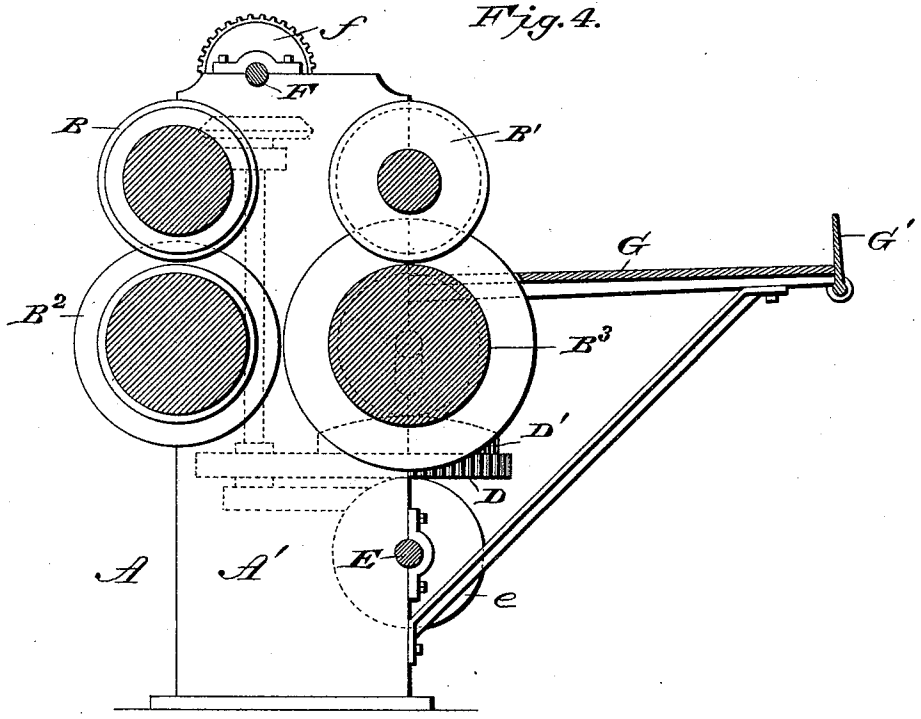
Fig. 4.



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UNITED STATES PATENT OFFICE.

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MILL FOR ROLLING TAPERS.

SPECIFICATION forming part of Letters Patent No. 517,322, dated March 27, 1894.

Application filed December 21, 1893. Serial No. 494,338. (No model.)

To all whom it may concern:

Be it known that I, CHARLES B. ANDREWS, a citizen of the United States of America, residing at Lebanon, in the county of Lebanon and State of Pennsylvania, have invented certain new and useful Improvements in Mills for Rolling Tapers; 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 object of this invention is to provide a rolling-mill with means for shaping or tapering metal rails or bars by adjusting one roll relative to the other, the adjustable or movable roll being automatically placed in engagement by the bar operated upon striking against a trip which throws into gear the mechanism which governs the movement of the adjustable roll.

The invention consists in the combination of a stationary roll and a movable roll which is adjusted by pattern-cams, and means for automatically operating or throwing the gearing in operation by the bar, rail or piece of metal which is being shaped or tapered, as will be hereinafter fully set forth.

In the accompanying drawings which illustrate my invention, Figure 1 is a front elevation of a rolling-mill showing my improvements applied. Fig. 2 is a sectional view on the line 2—2 of Fig. 1. Fig. 3 is a sectional view on the line 3—3, and Fig. 4 is a section on the line 4—4.

A designates the frame of the machine, comprising uprights A′ A′ and A^2. Between the uprights A′ A′ are journaled in the usual manner the upper rolls B and B′, and beneath these rolls are the rolls B^2 and B^3, the roll B^2 being vertically movable in its bearings. The rolls are of ordinary construction and the shafts thereof are geared to each other and to the driving mechanism in the usual manner.

To the uprights A′ A′ are rigidly secured brackets *a a* and *a′ a′* which provide bearings for vertical shafts C C, the lower brackets also forming supports for gearwheels D D, and are each braced by a support or standard a^2.

The uprights of the frame of the machine have bearings for horizontal shafts E and E′ which are coupled to each other, the shaft E′ having keyed thereon a pinion or gearwheel E^2 which meshes with one of the gearwheels of the driving mechanism, and at the upper ends of the uprights A′ A′ is journaled a shaft F having beveled pinions *f f* in mesh with beveled pinions *c c* keyed to the upper ends of the vertical shafts C, the lower ends of said shafts carrying pinions *c′* which mesh with the gearwheels D supported on the brackets *a′*. The gearwheels D are removably supported upon the brackets, and the under sides of the same are provided with friction surfaces with which friction disks *e* mounted on the shaft E engage. Upon the upper side of the gearwheels D are suitably attached or formed pattern-cams D′, the contour of which determines the shape or taper given to the bar or rail passing between the rolls. The shaft of the vertically movable roll B^3 has keyed thereon beyond the uprights A′ friction disks *b* with which the pattern-cams engage to raise and lower the said roll. The shaft F carries beyond one of the beveled pinions *f* a ratchet-wheel F′, and between the ratchet-wheel and beveled pinion the shaft has loosely mounted thereon an arm F^2 having a pawl *f′* which is adapted to engage with the ratchet-wheel and move the shaft F when the arm is actuated. The arm F^2 may be actuated manually if desired, but I prefer to provide means for automatically actuating the same at the proper time, the movement being governed by the rail or bar which is being operated upon, and to produce this automatic operation I provide the uprights of the frame with a table G, said table extending beyond the uprights of the frame for a suitable distance, and at the outer end of the same is a trip-plate G which is adapted to swing on a line with or below said table. The trip-plate G has an arm *g* which is connected by a rod or link *g′* to the arm or lever F^2. The table can be constructed so as to be readily attached to and detached from the frame of the machine, and means may be provided for extending the table according to the length of the rail or bar to be operated upon.

In operation, the gearwheels having the pattern-cams secured thereto are set so that

the shaft of the vertically movable roll will be at the lower end of its bearings and the friction disks thereon out of engagement with the pattern-cams, and as the gearwheels are supported by the bracket there will not be sufficient friction between the under side of the same and the friction disks *e* to turn them; after the machine has been set the bar or rail to be operated upon is passed between the upper and lower rolls B and B^2 and is fed therefrom to corresponding passes between the rolls B′ and B^3 which turn but do not operate upon the bar or rail until the lower roll is raised. To give the bar or rail a shape other than that given by the passes of the first pair of rolls the lever F^2 is actuated, which gives a partial rotation to the shaft F, and through the medium of the pinions *f* and *c* will rotate the shafts C and pinions *c′*, and this movement will bring one end of the pattern-cams in engagement with the friction disks *b* on the roll B^3, and the weight of said roll being on the pattern-cam will force the gearwheel in contact with the friction disks *e* on the driven shaft E. The vertical movement of the roll B^3 corresponding with the surface of the pattern-cams imparts the shape of the cam to the bar or rail operated upon. When it is desired that the parts be operated automatically the rail or bar to be shaped or tapered will be carried by the rolls B and B^2 to and beyond the rolls B′ and B^3 and the end passing over the table G will strike the trip-plate G′ so as to actuate the lever F^2 at the proper time.

A rolling-mill constructed as shown and described is primarily designed for rolling switch-points of railroad rails, but it is obvious that the machine could be used for other purposes.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a taper rolling-machine constructed substantially as shown, the combination, of a vertically movable roll having friction disks, of shaping cams mounted on a gearwheel, and driving disks mounted on a driven shaft, said driving disks engaging with the under side of the gearwheels which carry the pattern-cams, substantially as shown and for the purpose set forth.

2. In a taper rolling-mill, the combination, of a vertically movable roll having friction disks, a gearwheel suitably supported and having connected thereto pattern-cams, friction disks mounted on a driven shaft for engagement with the under side of the gearwheel which supports the pattern-cams, and mechanism for turning the gearwheels to bring the pattern-cams in engagement with the friction disks of the roll so that the weight of the roll will be transmitted to the friction disks carried by the driven shaft, for the purpose set forth.

3. The combination in a taper rolling-mill having a vertically movable roll which is adapted to be raised and lowered by suitably supported pattern-cams, of gearwheels to which said pattern-cams are secured, shafts having pinions which engage with said gearwheels and pinions which mesh with pinions on a shaft F, the shaft F being provided with means for turning the same so as to bring the pattern-cams in engagement with disks carried by the movable roll so that the weight of said roll will rest upon the pattern-cams to cause the gearwheels thereof to connect with the driving gear of the mill, substantially as shown.

4. The combination in a rolling-mill having a vertically movable shaping roll, supported upon pattern-cams, of a table having a trip-plate with which the bar to be shaped engages, said trip-plate automatically placing the pattern-cams in engagement with the shaping roll.

5. In a taper rolling-mill having pattern-cams for governing the vertical movement of the shaping roll, the combination of a suitably supported trip-plate with which the bar or rail operated upon by the rolls engages, said trip-plate when lowered actuating shafts and gearing to move the pattern-cams in engagement with the shaping roll, substantially as shown and for the purpose set forth.

6. In a taper rolling-mill, the combination, of a table carrying at its end farthest from the rolls a projecting plate having an arm attached thereto, a rod connected to said arm and to a lever carrying a pawl, a shaft having a ratchet-wheel with which the pawl engages and geared to a vertical shaft or shafts, said vertical shafts having pinions in mesh with gearwheels carrying pattern-cams, the gear wheels being frictionally actuated, substantially as shown and for the purpose set forth.

7. The combination in a rolling-mill for shaping bars of metal having driven rolls and pattern-cams, tripping mechanism actuated by the bar or rail to be operated upon, said tripping mechanism throwing into engagement the pattern-cams with the movable shaping roll.

8. The combination in a taper rolling-mill, having rolls and pattern-cams, of a table having a trip-plate which is actuated by the bar being shaped, said trip plate being adapted to be moved by said bar on a line with or below the table, and means connected with the trip-plate for causing the pattern-cams to engage with the shaping rolls, substantially as shown.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES B. ANDREWS.

Witnesses:
JAMES D. KERR,
DAVID A. GUIGRICH.