No. 848,123. PATENTED MAR. 26, 1907.

E. NORTON.

WORK REVERSING MECHANISM FOR ROLLING MILLS.

APPLICATION FILED APR. 19, 1905.

2 SHEETS—SHEET 1.

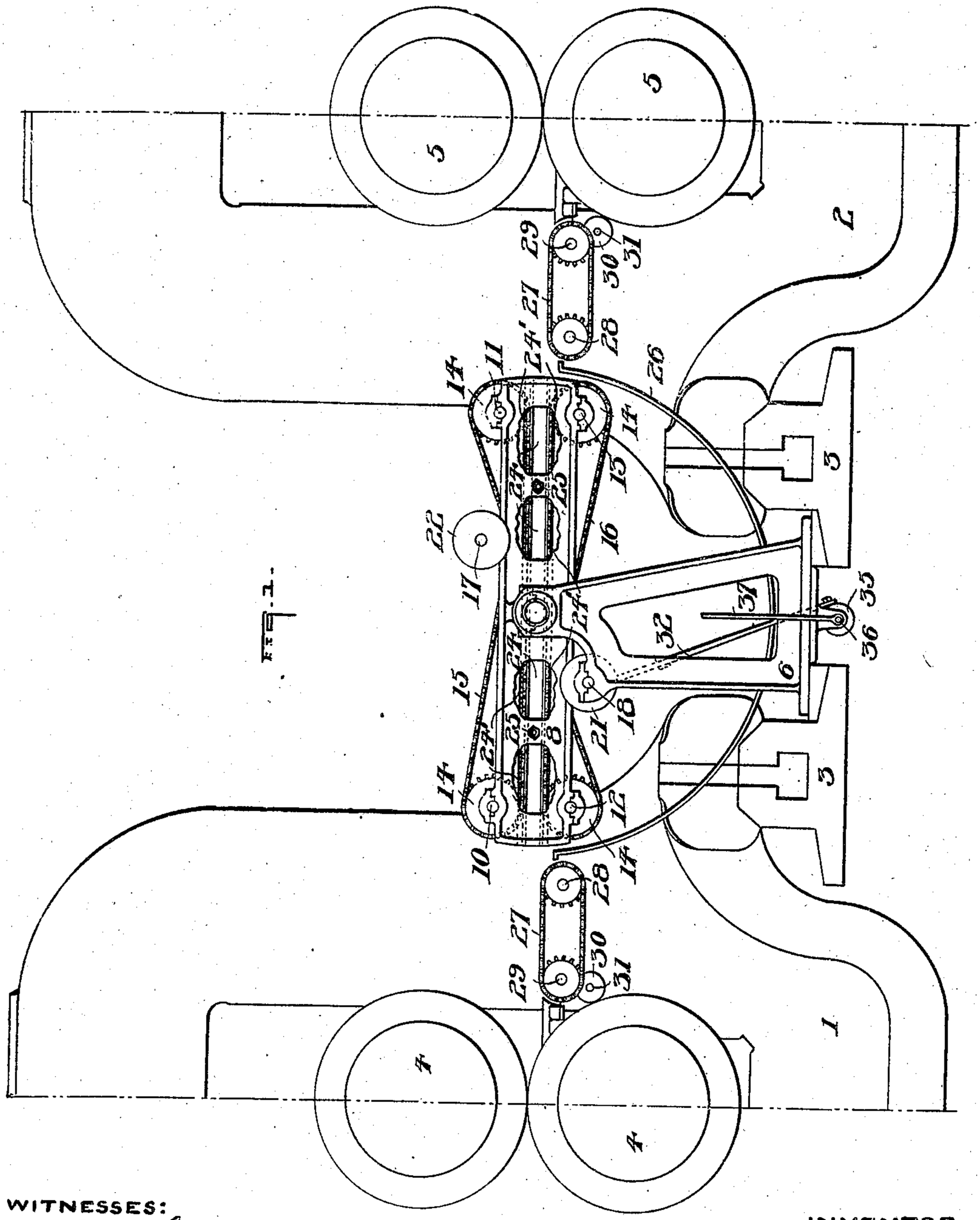

FIG. 1.

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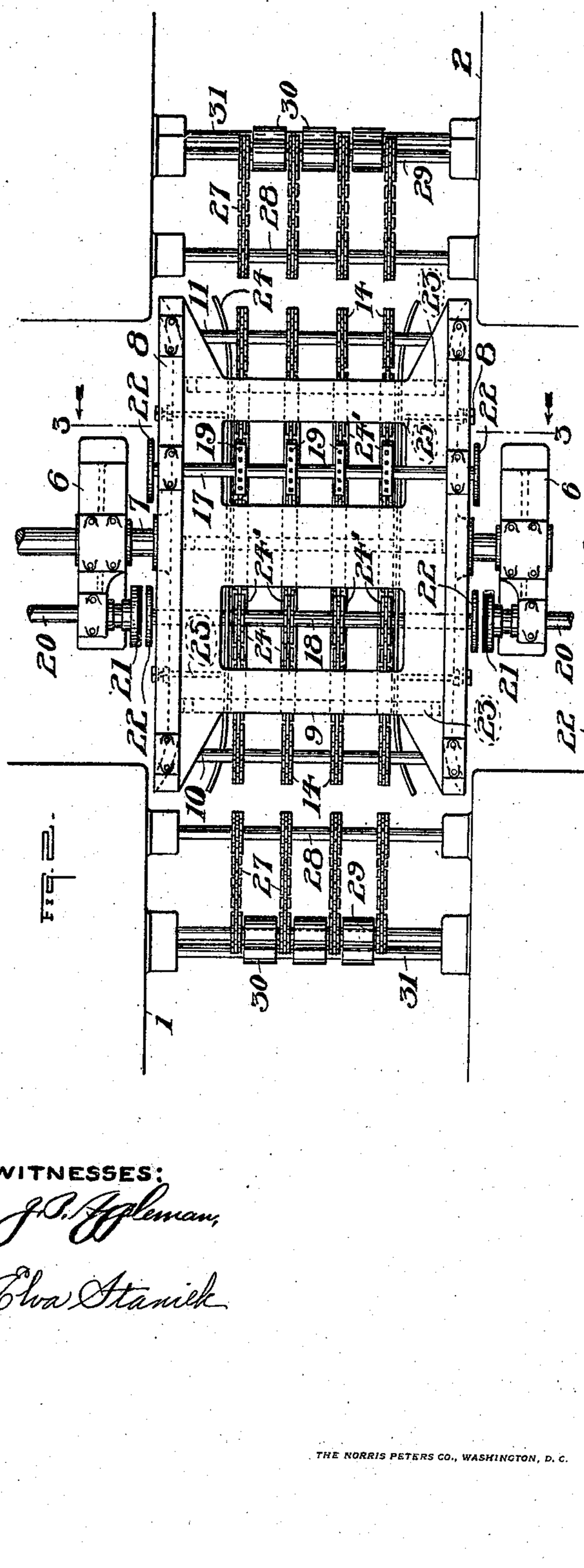

FIG. 2.

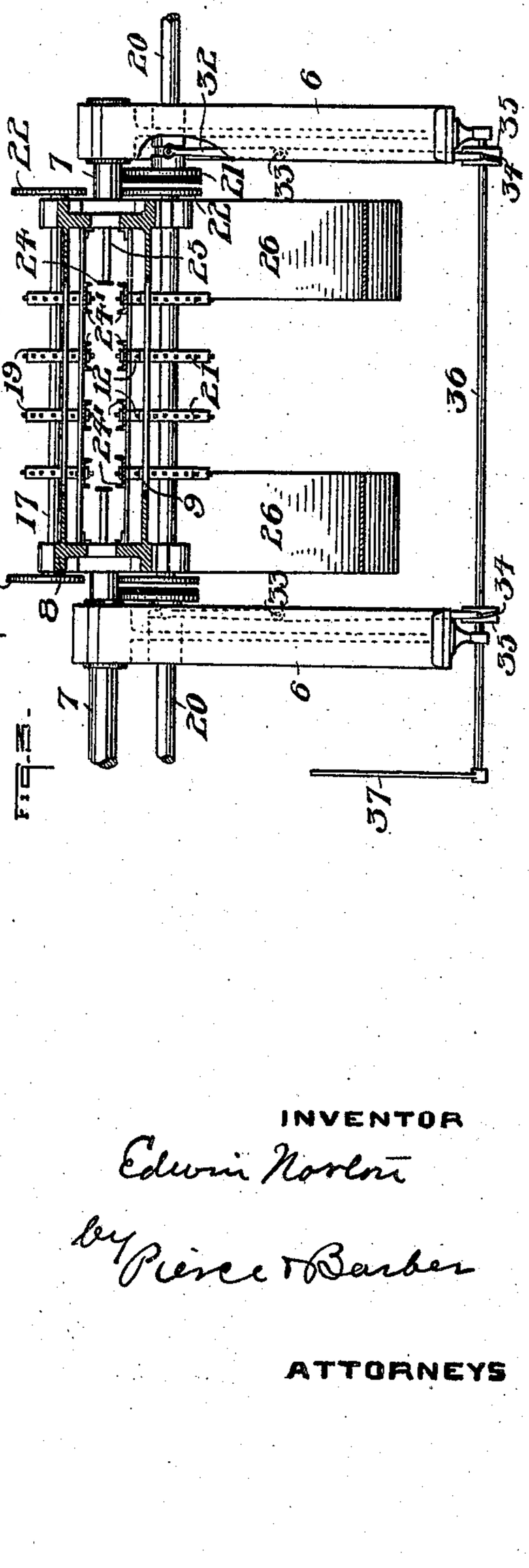

FIG. 3.

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UNITED STATES PATENT OFFICE.

EDWIN NORTON, OF NEW YORK, N. Y.

WORK-REVERSING MECHANISM FOR ROLLING-MILLS.

No. 848,123. Specification of Letters Patent. Patented March 26, 1907.

Application filed April 19, 1905. Serial No. 256,450.

To all whom it may concern:

Be it known that I, EDWIN NORTON, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented or discovered new and useful Improvements in Work-Reversing Mechanism for Rolling-Mills, of which the following is a specification.

My invention relates to mechanism by which metal sheets, plates, and the like may after passing through one stand of rolls be reversed end for end and passed through another stand of rolls.

My invention has relation also to the combination of such mechanism with one or both stands of rolls.

I do not restrict my invention to any details of construction, as my drawings are illustrative of only one manner in which the same may be practiced.

The present invention has special utility in continuous mills where metal sheets are passed in succession through a series of stands of reducing-rolls, but is capable of use with only one or two stands. When metal sheets have passed the same end foremost through several sets of rolls, the molecular structure of the metal becomes changed, so as to produce an inferior article, or, at least, articles inferior to those produced by my invention whereby the sheets are reversed end for end between successive passes. By feeding the metal in opposite directions, so that now one end first enters the rolls and afterward the other end enters a pair of rolls, the strain and displacement of the molecules caused by one pass are neutralized by those of another. I not only reverse the sheets end for end between passes, but I preferably turn them upside down at the same time. This is advantageous, as it gives both sides of the sheets the same treatment, and therefore further diminishes strains in the metal.

Referring to the drawings forming a part of this specification, Figure 1 is a side elevation of my invention; Fig. 2, a plan thereof, and Fig. 3 a vertical section on the line 3 3 of Fig. 2.

On the drawings, 1 and 2 designate two housings mounted on the shoes 3. The housing 1 carries the stand of horizontal rolls 4 and the housing 2 the rolls 5. The two stands of rolls 4 and 5 are parallel to each other and spaced apart, so that my work-reversing mechanism can be mounted and operated between them. Though I have shown the passes of said rolls in a horizontal plane, they may be inclined thereto, so as to feed the work by gravity into and beyond the rolls.

On the standards 6, one on each side of the path of the metal between the two sets of rolls, I mount my reversing mechanism or table, supported by the trunnions 7, one being extended and driven by any suitable power by which it may be rotated and stopped when desired. The inner ends of the trunnions 7 are secured to the parallel sides 8 of the work-reversing table, the sides being connected together by the spaced parallel plates 9. In the space between the plates 9 is a passage in which metal sheets having passed thereinto from one set of rolls are reversed end for end and passed therefrom through a second set of rolls. This passage has its opposite ends arranged opposite the passes of the two sets of rolls 2 and 3, between which the table is located.

Journaled on the sides 8, at the ends of the table, are the four shafts 10, 11, 12, and 13, all parallel with the trunnions 7 and provided with sheaves 14 to receive the endless conveyer-chains 15 and 16, the former running over the sheaves on the shafts 10 and 11 and the latter over the sheaves on the shafts 12 and 13. On the sides 8 are also journaled the shaft 17 between the shafts 10 and 11 and the shaft 18 between the shafts 12 and 13, the shafts 17 and 18 carrying the sheaves or pulleys 19, which drive the said chains.

In each standard or housing 6 is a shaft 20, which carries between the housing and the table a clutch member 21, engageable with companion clutch members 22 on the shafts 17 and 18, the members 21 being located so that when the table is in normal work-receiving or work-discharging position the clutch members 22 on opposite ends of one of the shafts 17 and 18 will be in line with the members 21. The clutch members are slid into and out of engagement with the clutch members 22 by means of the levers 32, pivoted on the pins 33, carried by the standards 6. The lower ends of the levers are guided in the cam-grooves 34 in the wheels 35 on the shaft 36, journaled at the bottoms of the said standards. 37 represents a lever by which the shaft 36 may be rocked to cause the levers to swing, so as to push the clutch members 21 into operative engagement with the members 22. Other forms of clutch members and operating mechanism therefor may be used, as the particular types of the same do not con-

stitute the gist of my invention. In fact, other conveyer-driving devices than clutches may be used.

Supported on bars 23, secured transversely of the table between the plates 9, are the troughs or guides 24′ for the chains, the latter extending slightly above the former, so as to carry the plates resting on the chains into or from the table. While I have shown a chain conveyer, it is clear that cables or other equivalents may be substituted and that conveyers of a distinctly different type may be used, my invention not being limited to any type of conveyer.

A pair of gages 24 are mounted on the rods 25, secured in the sides 8 of the table, in which they may be made adjustable by regulating the distance the rods project inwardly. Below the table are two semicircular shields 26, or the shields may be omitted, if found unnecessary, occupying an arc just beyond the arc described by the end of the table during its half-revolutions; but any number of shields may be used.

Between the rolls 4 and the table are chain conveyers composed of the endless chains 27, running over sheaves on the shafts 28 and 29, the latter being driven by the friction-wheels 30, bearing against the lower roll 4. The wheels 30 are carried by the shaft 31, which with the shafts 27 and 29 are journaled in the housings 1. Between the table and the rolls 5 is a similar chain conveyer driven by the lower roll 5. It is evident that any suitable type of conveyer may be used in place of the conveyers 27.

The table stands in the position shown on Fig. 1 when sheets are fed into or from it. The sheets may pass in either direction, according to the direction of rotation of the rolls and the shafts 20. When it is desired to use my invention, the rolls 4 and 5 and the shafts 20 are started. The rolls cause both the conveyers 27 to travel in the same direction as the lower rolls of both stands. When a sheet is fed through the rolls 4, it passes upon the nearest conveyer 27, which carries it into the table and upon the lower chain therein. By operating the lever 37 the chain 16 will be started, so as to assist the sheet into the table if it has not entered sufficiently. A reverse movement of the lever will stop the feed of the sheet in the table. When the sheet is properly in the table, the latter is rotated a half-revolution by any suitable driving mechanism, the sheet being prevented from falling from the table by the guides 26. As soon as the table has been rotated a half-revolution it is stopped and the lever 37 operated to cause the lower conveyer in the table to feed the sheet upon the rear conveyer 27 and into the pass of the rolls 5. The conveyers 27 cause the sheets to be carried onward after they leave the first set of rolls in order that the rear end of the sheets may not engage with the upper roll when the table is rotated. The conveyer 27, which works in front of the second set of rolls, assists the feed of the sheets from the table and into the pass of the rolls.

I have described my invention minutely; but I have not intended thereby to restrict my invention to the combinations shown and described, as they may be variously modified. Parts may be added or omitted.

Having described my invention, I claim—

1. In a rolling-mill, two sets of rolls, a table in line therebetween to receive the work from the first set of rolls, means to rotate the table with the work therein end for end and upside down, means to retain the work in the table during such rotation, and means to cause the work to pass from the first set of rolls to the table, and when so reversed from the latter to the second set of rolls.

2. In a rolling-mill, two sets of rolls, a table arranged in line therebetween to receive the work from the first set of rolls and constructed to retain the plate when the table is upside down, means for reversing the table end for end and upside down, and means to cause the work to pass from the table when so reversed into the second set of rolls.

3. In a rolling-mill, two sets of rolls having their passes in the same plane, a rotary carrier therebetween having its axis of rotation substantially in the said plane and conveyers in said table forming a pass therein in said plane to receive the work from the first set of rolls and to discharge the work toward the second set of rolls.

4. In a rolling-mill, a work-reversing table having therethrough a work-feeding passage, a conveyer on each side of the passage, means for rotating the table to cause each conveyer to be alternately at the bottom of each passage, and means for causing the travel of the conveyers alternately.

5. In a rolling-mill, two sets of rolls, a table between the same having therein a work-feeding passage, means for reversing said table end for end and upside down, and means in said table for feeding work into and from said passage when the table is in any one of a plurality of positions.

6. In a rolling-mill, two sets of rolls, a table between the same having therein a work-feeding passage, means for reversing the table end for end and upside down, means in said table for feeding work into and from said passage when the table is in any one of a plurality of positions, and means coöperating with said feeding means to assist the work through said passage.

7. In a rolling-mill, a table rotatable on a horizontal axis and having therein a passage, a conveyer each side of said passage, independent driving means on said table for said conveyers, fixed driving means for said independent driving means, the latter being

adapted to be brought alternately into juxtaposition with said fixed driving means by the rotation of said table, and means for causing a temporary driving connection between said two driving means.

8. In a rolling-mill, two sets of rolls, a table between the same constructed to retain the plate when the table is upside down, means for reversing the table end for end and upside down, and means for feeding the work to and from the table in opposite directions relative to the table but in the same direction relative to the rolls.

Signed at New York, N. Y., this 10th day of April, 1905.

EDWIN NORTON.

Witnesses:
VINCENT J. KOWALSKI,
F. A. ASSMANN.