C. L. TAYLOR.

ROLLER TABLE FOR THREE HIGH ROLL MILLS.

APPLICATION FILED SEPT. 12, 1907.

916,500.

Patented Mar. 30, 1909.

5 SHEETS—SHEET 1.

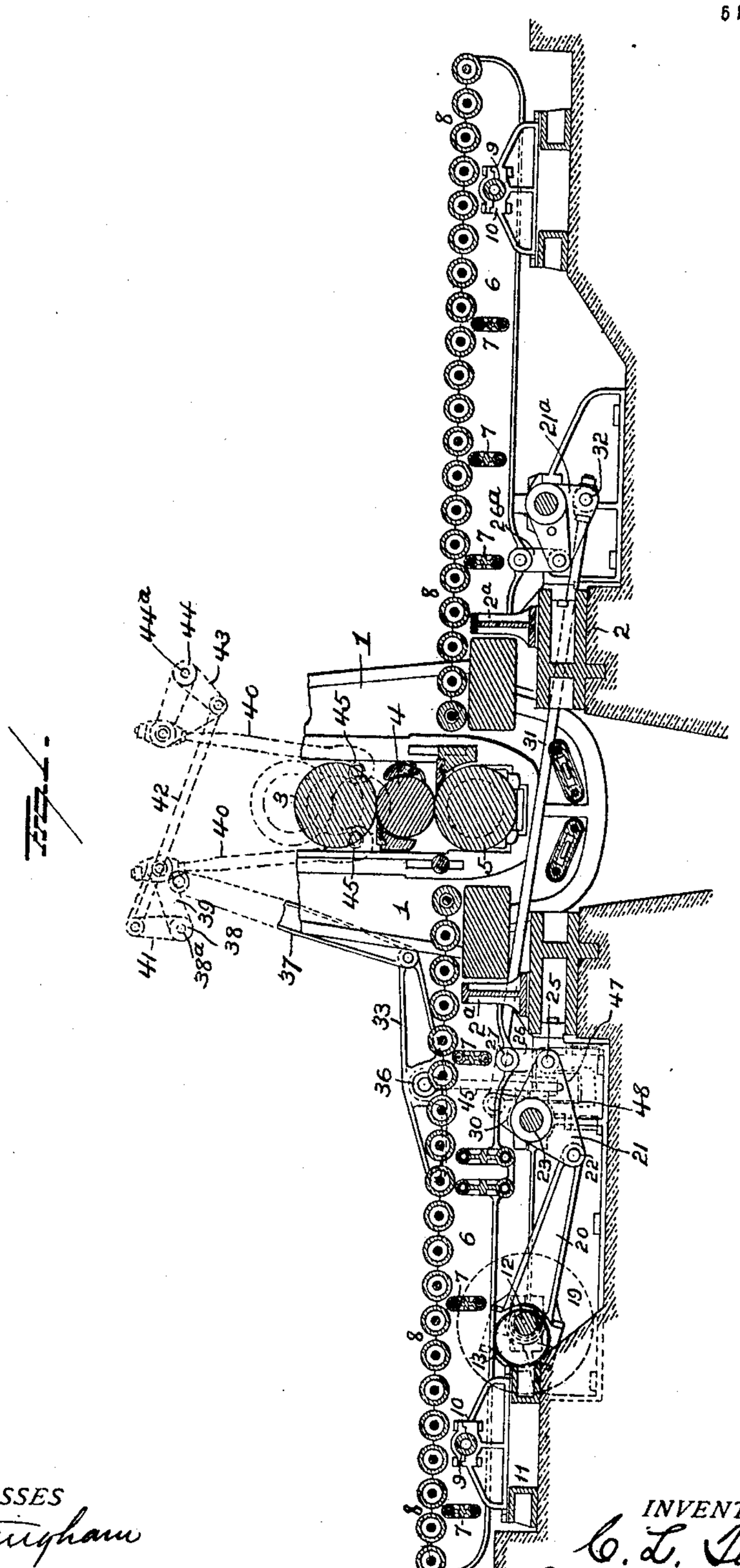

Fig. 1.

WITNESSES

E. L. Nottingham

G. F. Downing.

INVENTOR

C. L. Taylor

By H. A. Seymour

Attorney

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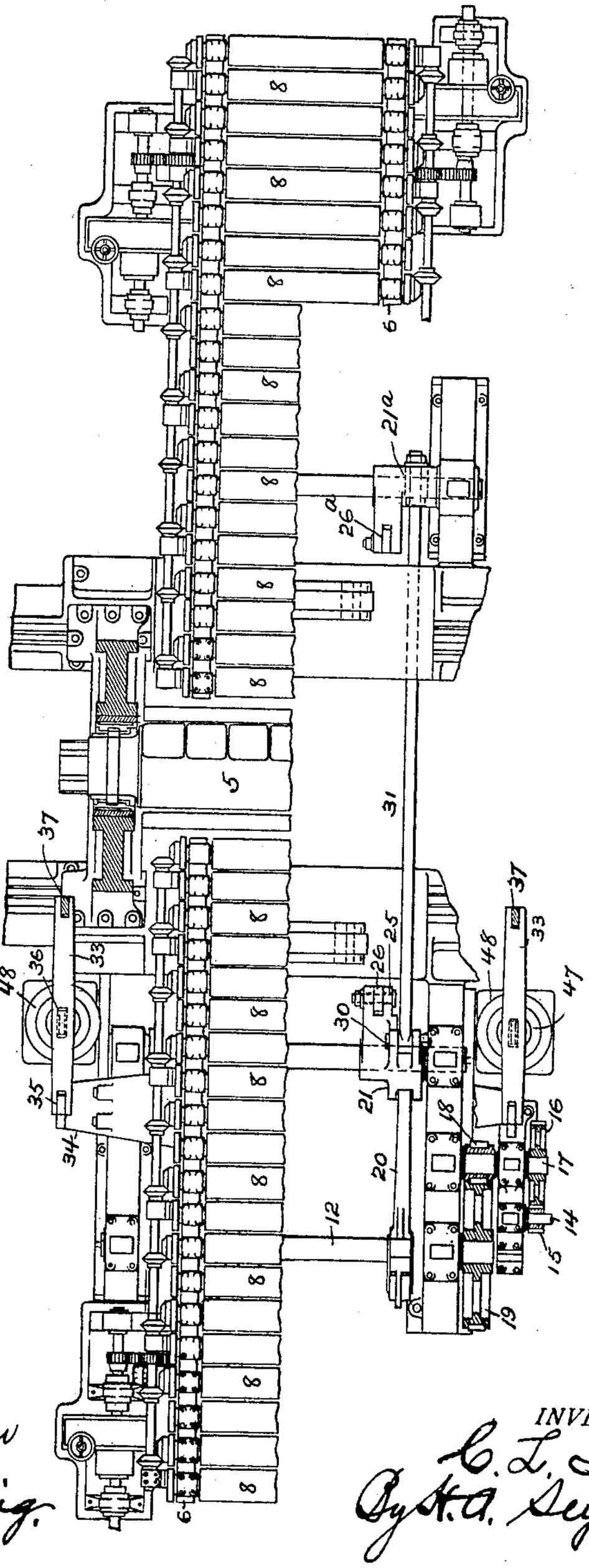

Fig. 2.

WITNESSES

E. Nottingham

G. F. Downing.

INVENTOR

C. L. Taylor

By H. A. Seymour

Attorney

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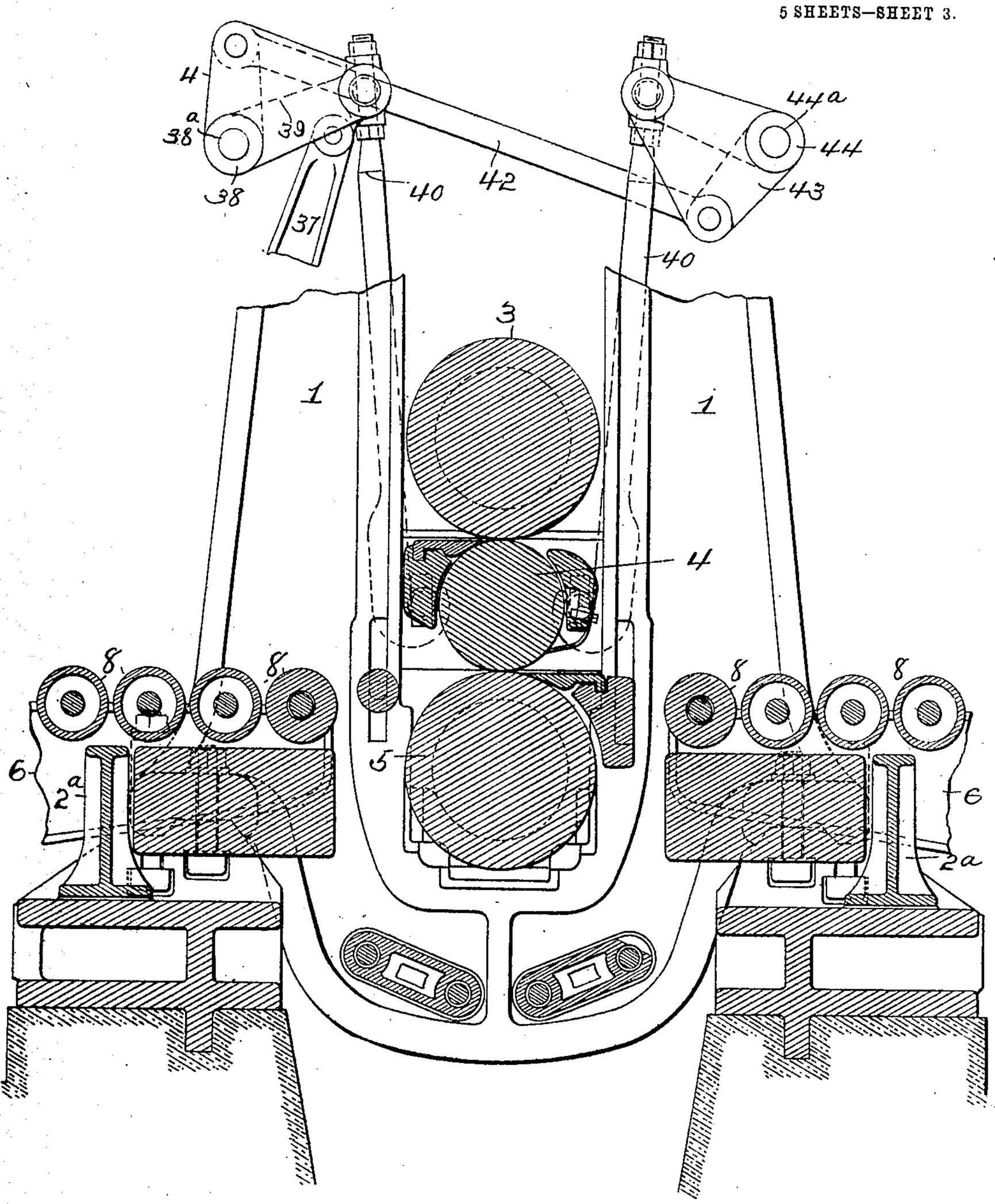

Fig. 3.

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E. L. Nottingham

G. F. Downing.

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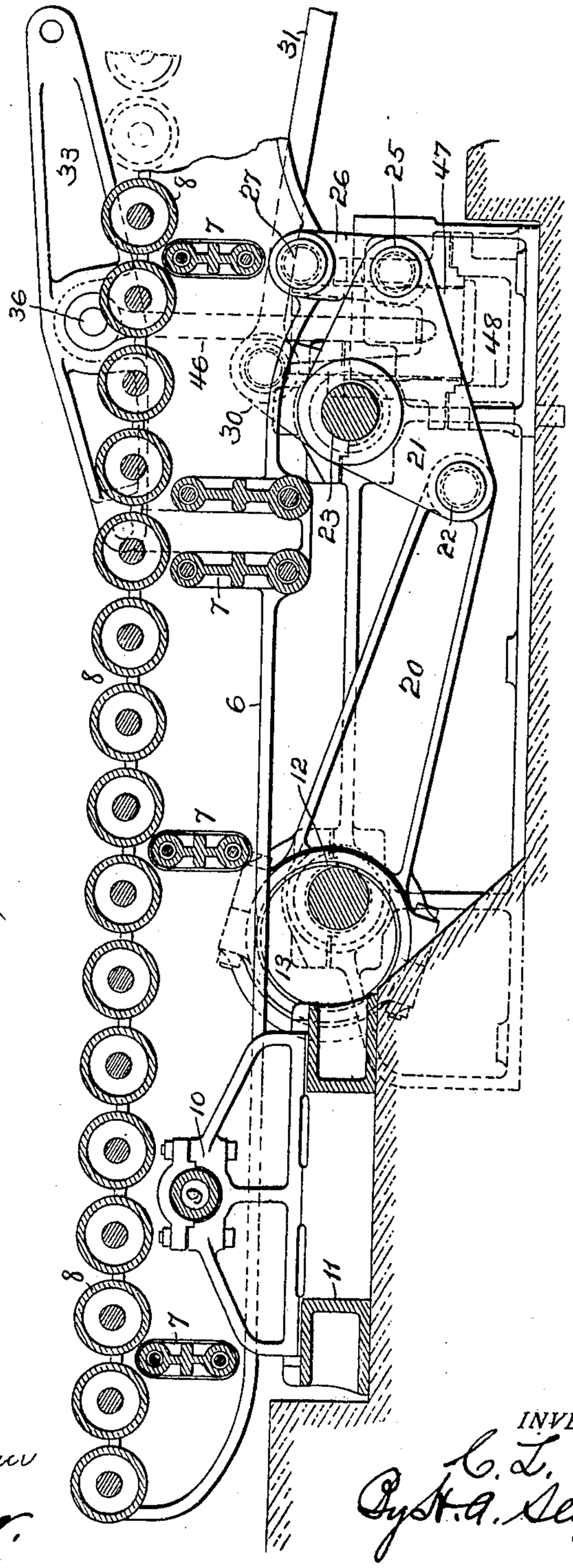

FIG. 3a.

WITNESSES

E. A. Nottingham

G. F. Downing.

INVENTOR

C. L. Taylor

By H. A. Seymour

Attorney

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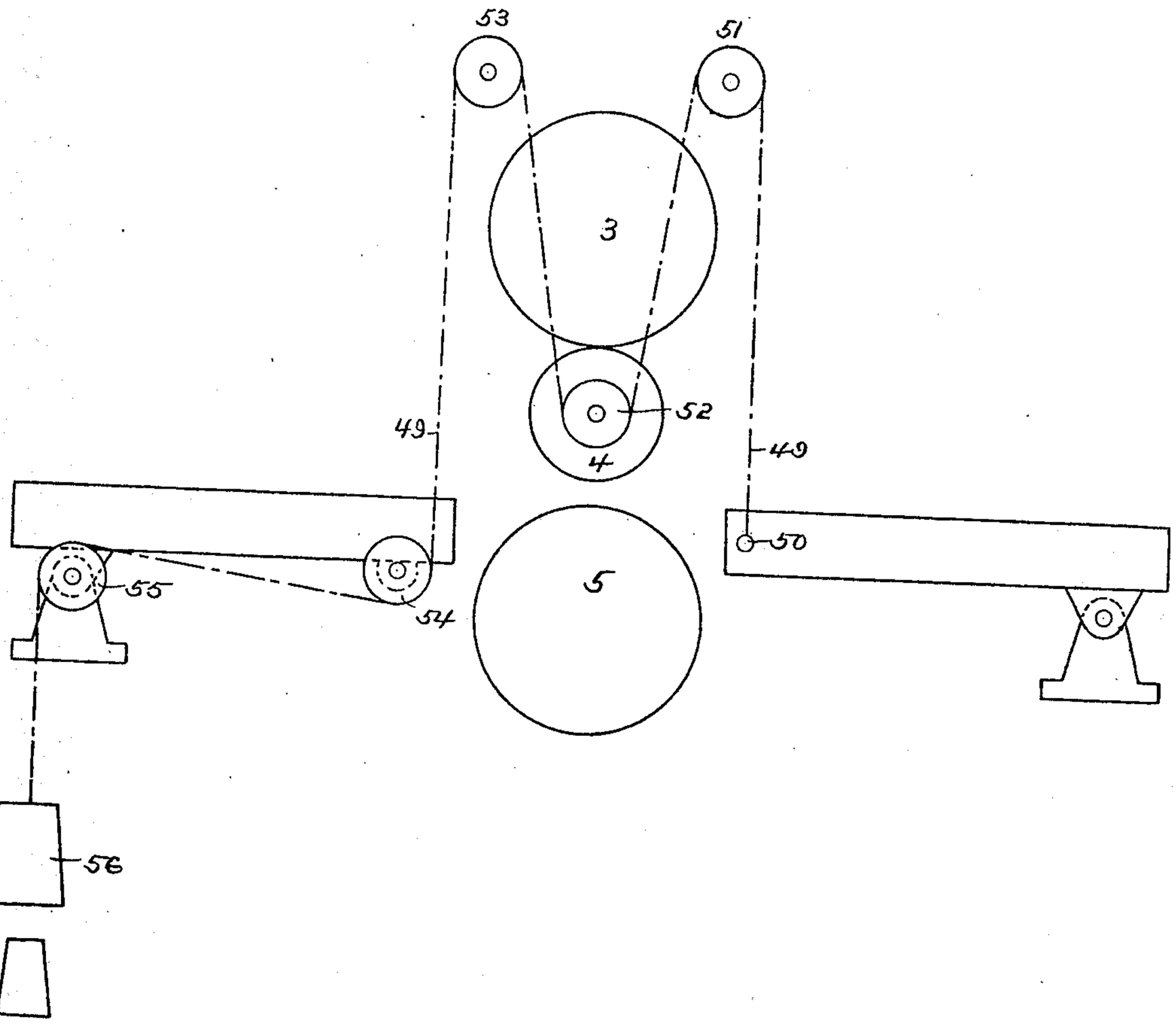
5 SHEETS—SHEET 5.

Fig. 4.



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C. L. Taylor

By A. G. Seymour

Attorney

UNITED STATES PATENT OFFICE.

CLARENCE L. TAYLOR, OF ALLIANCE, OHIO, ASSIGNOR TO THE MORGAN ENGINEERING COMPANY, OF ALLIANCE, OHIO.

ROLLER-TABLE FOR THREE-HIGH ROLL-MILLS.

No. 916,500. Specification of Letters Patent. Patented March 30, 1909.

Application filed September 12, 1907. Serial No. 392,594.

To all whom it may concern:

Be it known that I, CLARENCE L. TAYLOR, of Alliance, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Roller-Tables for Three-High Roll-Mills; 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.

My invention relates to improvement in roller tables for three high roll mills, the object being to provide means for shifting the intermediate roll to change the pass, simultaneously with the movement of the tables.

With this end in view my invention consists in the parts and combinations of parts and in the details of construction as will be more fully described and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in section through part of a three high roll mill and two roller tables. Fig. 2 is a plan view partly in section of same. Fig. 3 is an enlarged view in section through the mill and adjacent ends of the two tables. Fig. 3ª is a view of one roller table showing part of the mechanism for actuating the middle roll, simultaneously with the movements of the table, and Fig. 4 is a diagrammatic view in side elevation of a modification.

1 represents the side members of a three high roll mill, 2 the base thereof, and 3, 4 and 5 the upper, middle and lower rolls respectively, the middle roll, as will be hereinafter more fully described being provided with means whereby the same is raised and lowered to change the pass from the upper to the lower roll and vice versa.

Located on opposite sides of the mill are the roller tables, each composed of side beams or girders 6, braces 7 connecting the two beams 6, and rollers 8, the latter constituting the top of the table. The rollers of each table are coupled up to rotate in unison and motors and controlling devices are employed for rotating and changing the direction of rotation of said rollers. Each table thus constructed is loosely supported at its inner end and guided by guide bracket 3ª which is supported on base 2, and at its outer end by shaft 9 mounted in the bearings 10, the latter resting on a suitable base 11.

Located under and transversely to one table, is the shaft 12 carrying a cam 13. This shaft 12 is mounted in fixed bearings independently of the table, and is rotated by the gearing shown in Fig. 2, which comprises a driving shaft 14 carrying a pinion 15 which meshes with gear wheel 16 on shaft 17. This shaft 17 carries a gear wheel 18 meshing with the gear wheel 19 on shaft 12.

Mounted on cam 13 is the connecting rod 20, connected at its inner end, or its end adjacent to the rolling mill, to the lever 21 at the point 22. This lever is fixed to shaft 23, and is connected at 25 by link 26 with the table 6 at the point 27. This mechanism, to wit, cam 13, connecting rod 20, lever 21 and link 26 may be duplicated at the opposite side of the same table, but a duplication of the cam 13 and connecting rod 20 may be dispensed with, motion being transmitted to the lever 21 at the opposite end of shaft 23, through the latter. The links 26, support the opposite sides of the table.

From the foregoing it will be seen, that if cam 13 be rotated, levers 21 will be rocked, thus elevating the links 26 and raising the inner end of the table from the plane of the lower pass to the plane of the upper pass.

Pivotally secured to upwardly projecting member 30 of levers 21, in plane above the plane of shaft 23, is a connecting rod 31 the opposite end of which is connected at 32, below the plane of shaft 23ª, to the lever 21ª located under the inner end of the table at the opposite side of the mill. There are two levers 21ª, one at each side of the table, and they are connected by links 26ª with the table near its inner end.

By means of the connecting rod 31 between the mechanisms supporting the inner ends of the two tables, it will be seen, that with the tables in the positions shown in Fig. 1, if the cam 13 be rotated, the inner ends of both tables will be tilted and carried from the plane of the lower pass, to the plane of the upper pass, and by continuing the motion of the cam, they will be simultaneously lowered to the plane of the lower pass, thus permitting the material being worked, to be delivered by the roller table to one pass and returned by the other.

In Fig. 1 I have shown the mechanism for raising and lowering the intermediate roll 4 simultaneously with the movements of the

tables. This mechanism comprises a walking beam 33 connected at 34, by link 35 with one of the roller tables, preferably the one to which the power is directly applied for tilting both tables. This beam 33 is fulcrumed at 36 and carries at its end adjacent to the mill, the pitman 37 connected to the lever 38 fulcrumed on shaft 38[a]. This lever is provided with a member 39 carrying the depending hook rod 40 and with an upwardly projecting member 41, to which connecting rod 42 is pivotally attached. This rod 42 extends transversely across the mill, and is connected to the depending member 43 of lever 44, which latter is also provided with an upwardly and inwardly projecting member carrying the hook rod 40. The hook rods 40 are located adjacent to one end frame of the mill, and the hooks thereof engage trunnions or rounded portions 45 which are prolongations of the rest bars which are extended through holes provided therefor in the bearings supporting the neck of the middle roll. Shafts 38[a] and 44[a] extend lengthwise the mill, and are provided at their opposite ends, with levers in all respects identical with the lever 44, each of which carries a hook rod identical with the rods 40. The four hook rods, thus described engage the trunnions 45, hence it will be seen that when the inner end of table is elevated to aline with the upper pass, the end of walking beam 33 adjacent to the mill will be depressed, thus lowering hooks 40 and lowering roll 4.

As the table is lowered to aline with the lower pass, the hooks and roll 4 carried thereby will be elevated.

In rolling mills of this type the upper roll 3 is adjusted by means of screws, and in order to compensate for the changes in the position of the top roll 3, the fulcrum pin 36 of walking beam 33 is connected with the plunger rod 46 connected to plunger 47 mounted in cylinder 48. This cylinder is constantly open to accumulator pressure, hence as the top roll 3 is adjusted, the fulcrum of the walking beam changes to conform thereto, thus providing for a movement of the middle roll sufficient to close one pass and open the other.

In the diagrammatic view Fig. 4 I have shown a cable 49 connected at 50 to the inner end of one roller table, then passing upwardly over a sheave 51, down under a sheave 52 on the neck of the middle roll 4, thence up over sheave 53, down under sheave 54 carried by the other table near the free end of the latter, and thence rearwardly over sheave 55 in a line with the axis of the table, the free end of the cable carrying a counterweight 56. The arrangement of ropes and sheaves shown in Fig. 4, is duplicated, at the opposite side of the tables and end of middle roll. With this construction, as the tables are tilted to aline with the upper pass, the middle roll will be lowered, and when the tables are lowered to aline with the lower pass the middle roll will be elevated, the counterweights compensating for all changes in the adjustment of the upper roll.

It is evident that many slight changes might be resorted to in the relative arrangement of the parts shown and described without departing from the spirit and scope of my invention hence I would have it understood that I do not wish to confine myself to the exact construction shown and described, but,

Having fully described my invention what I claim as new and desire to secure by Letters-Patent, is:—

1. The combination of a three-high roll mill, a table located at one side of the mill constructed and arranged so that the end of the table nearest the mill can be raised and lowered, means connected with the table adapted to raise and lower the said end and means located above the table and connected to it and the middle roll adapted to move the roll in a vertical direction simultaneously with the movement of the end of the table.

2. The combination of a three-high roll mill, a table located at one side of the mill constructed and arranged so that the end of the table nearest the mill can be raised and lowered, means connected to the table adapted to raise and lower the said end, and lever mechanism located above the table and connected to it and the middle roll adapted to move the roll in a vertical direction simultaneously with the movement of the end of the table.

3. The combination of a three-high roll mill, a table located at one side of the mill constructed and arranged so that the end of the table nearest the mill can be raised and lowered, means connected to the table adapted to raise and lower the said end, lever mechanism connected with the table and middle roll adapted to move the roll in a vertical direction simultaneously with the movement of the end of the table, and a yielding member which is connected to the lever mechanism in such a way that when the table is moved, the lever mechanism will automatically adjust itself to the changes of position of the upper roll.

4. The combination with a three high roll mill, of a roller table, means for tilting said table, lever mechanism on the mill supporting the middle roll of the latter, a walking beam connecting the rocking table and said lever mechanism and a yielding fulcrum for said walking beam.

5. The combination with a three high roll mill, of a roller table, means for tilting said table, lever mechanism on the mill support-

ing the middle roll of the latter, a walking beam connecting the table and said lever mechanism, a cylinder constantly open to accumulator pressure, and a plunger in said cylinder and carrying the fulcrum of the walking beam.

6. The combination of a three-high roll mill, a table located at one side of the mill constructed and arranged so that the end of the table nearest the mill can be raised and lowered, means connected to the table adapted to raise and lower said end, means connected to the table and the middle roll adapted to shift the roll in a vertical direction simultaneously with the movement of the end of the table, and yielding means connected to the roll shifting means in such a way that when the table is moved the roll shifting means will automatically adjust itself to the changes of position of the upper roll.

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

CLARENCE L. TAYLOR.

Witnesses:

N. C. FETTERS,

A. L. ROBERTS.