6 Sheets--Sheet 1.

G. FRITZ.

Rolling Mills.

No. 133,771. Patented Dec. 10, 1872.

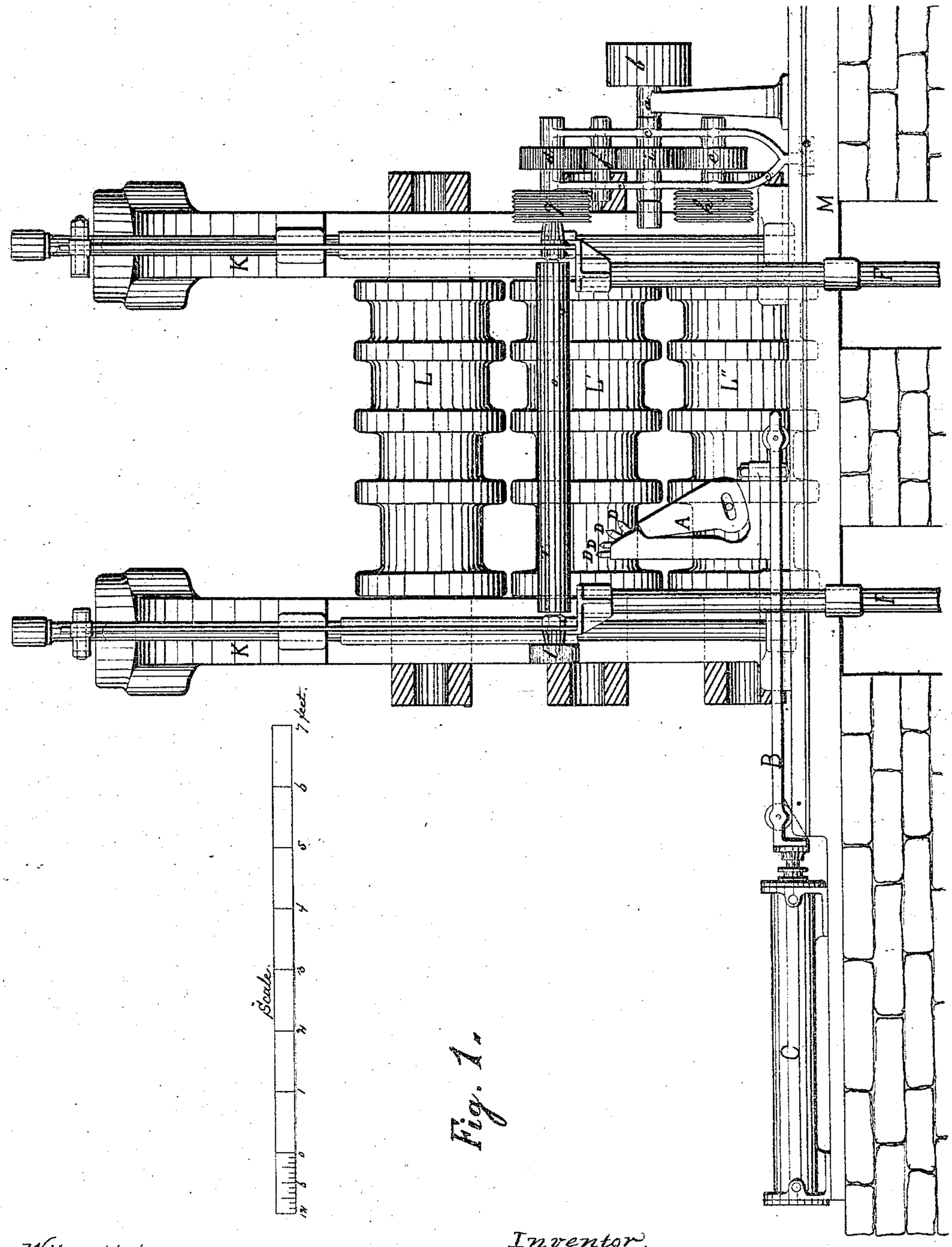


Fig. 1.

Witnesses.

Isaac E. Chandlee
Lyns Ellis

Inventor.

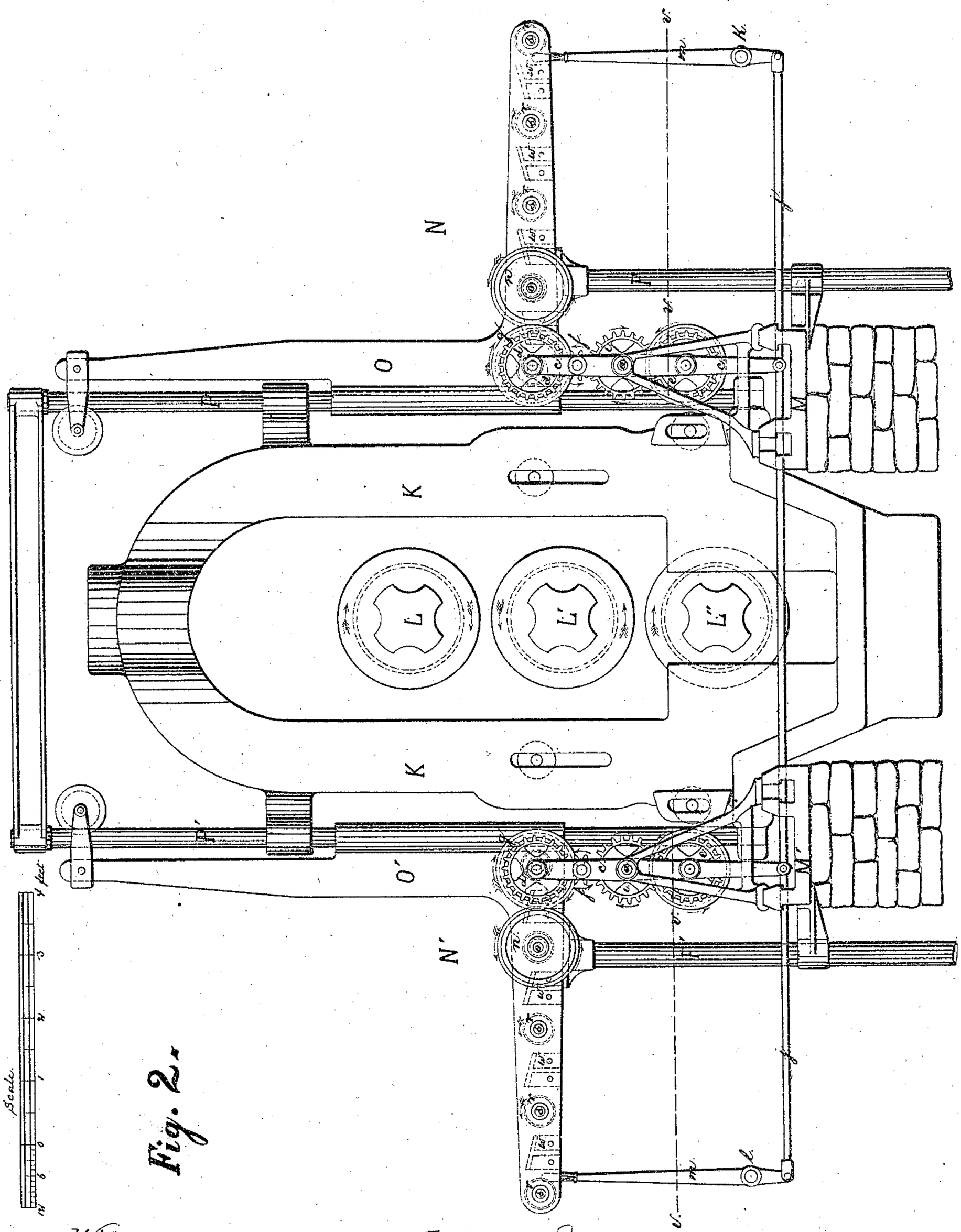
George Fritz

6 Sheets--Sheet 2.

G. FRITZ.

Rolling Mills.

No. 133,771. Patented Dec. 10, 1872.



Witnesses.

Isaac E. Chandler

Chas Eccles

Inventor.

George Fritz

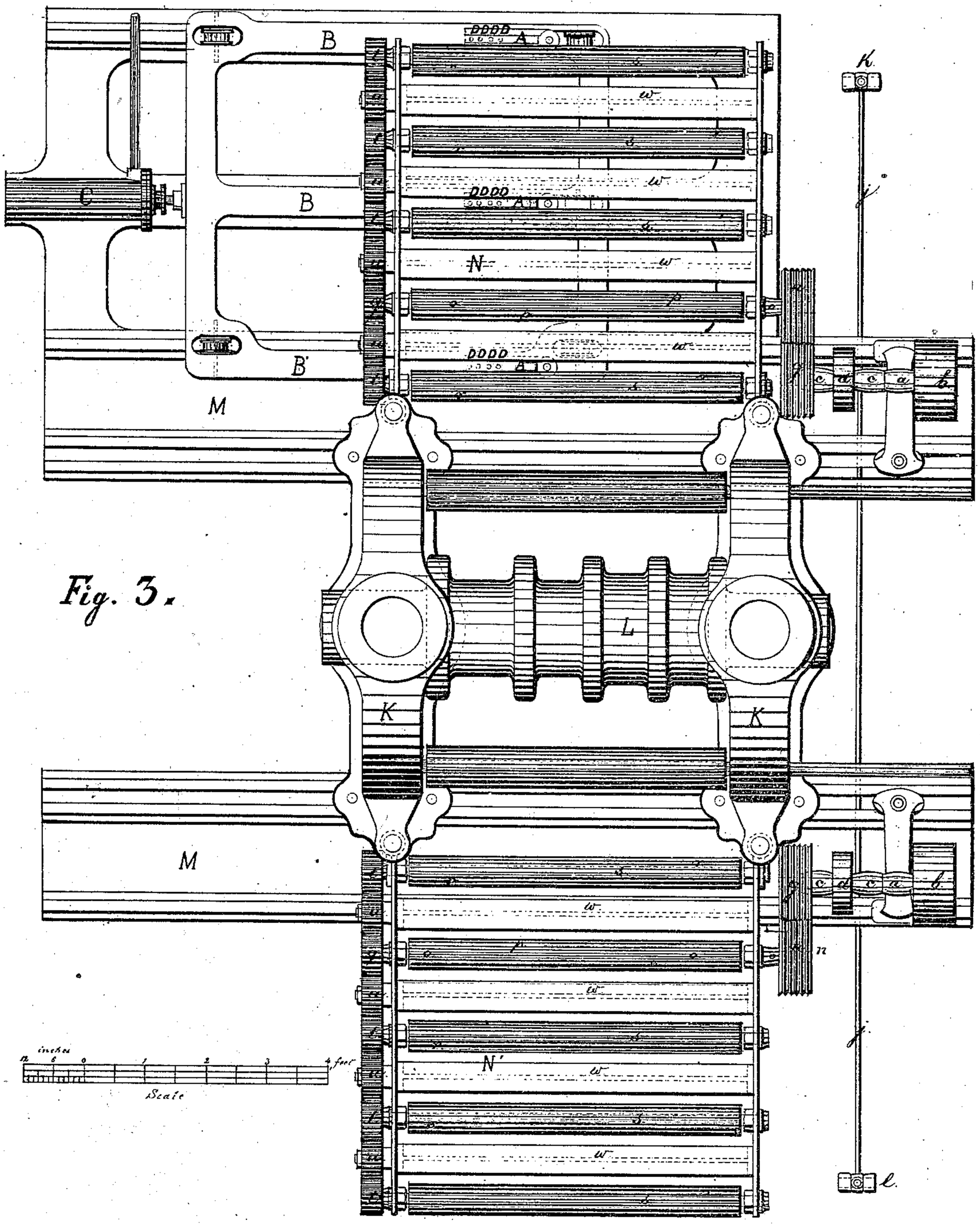
6 Sheets--Sheet 3.

G. FRITZ.

Rolling Mills.

No. 133,771. Patented Dec. 10, 1872.

Fig. 3.



Inventor.

George Fritz

6 Sheets--Sheet 4.

G. FRITZ.

Rolling Mills.

No. 133,771. Patented Dec. 10, 1872.

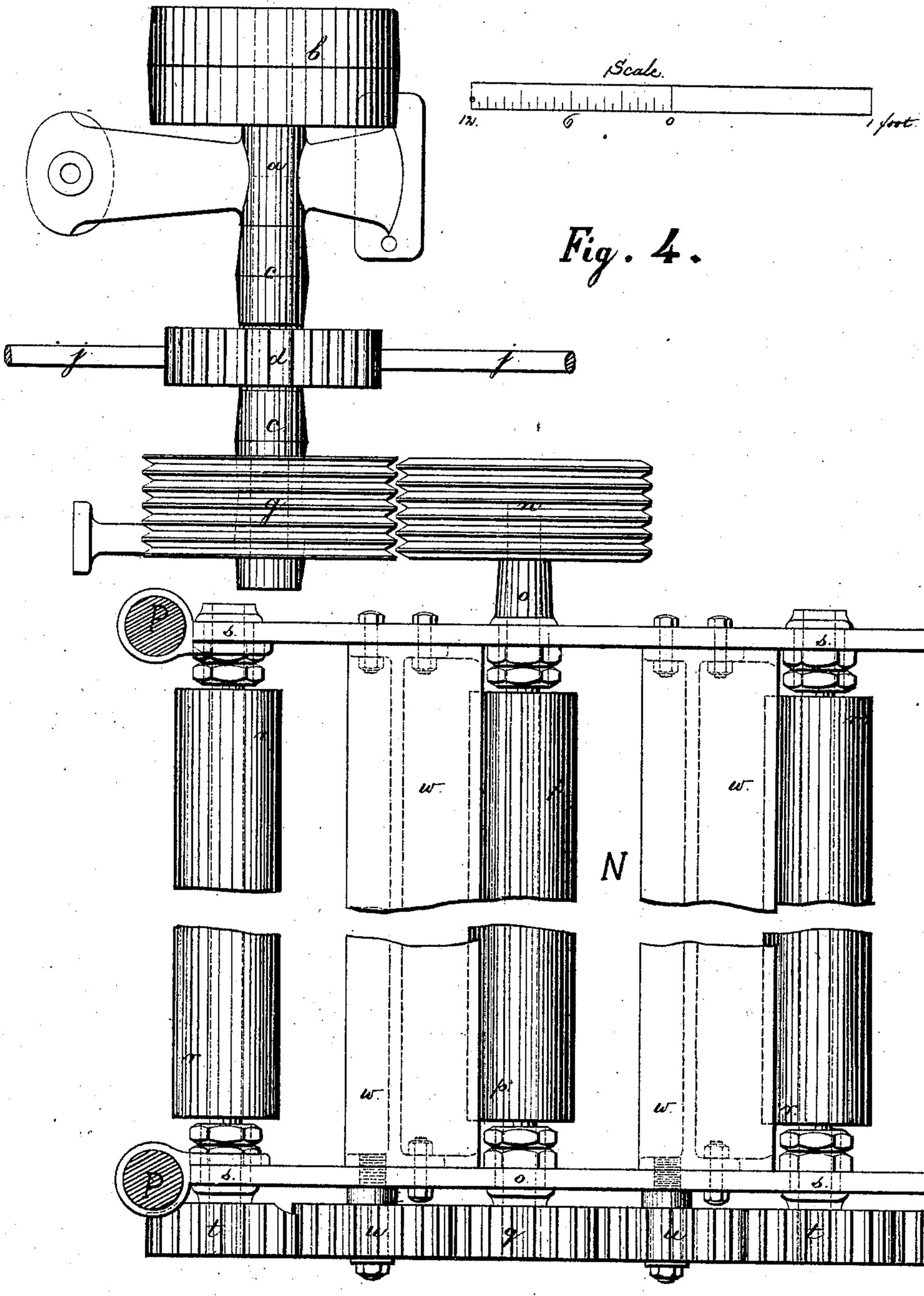


Fig. 4.

Inventor.

George Fritz

6 Sheets--Sheet 5.

G. FRITZ.

Rolling Mills.

No. 133,771. Patented Dec. 10, 1872.

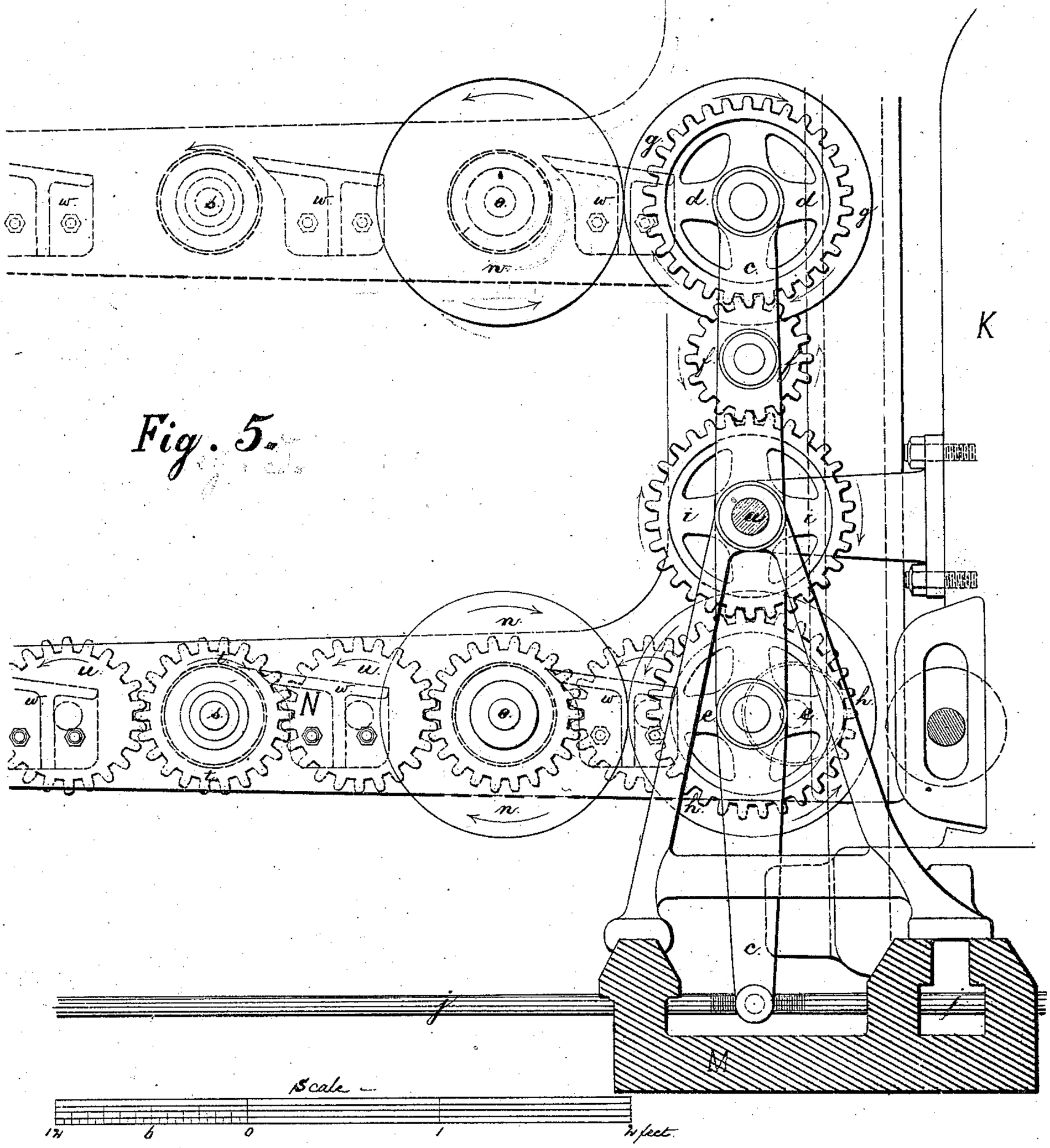


Fig. 5.

Inventor,

George Fritz

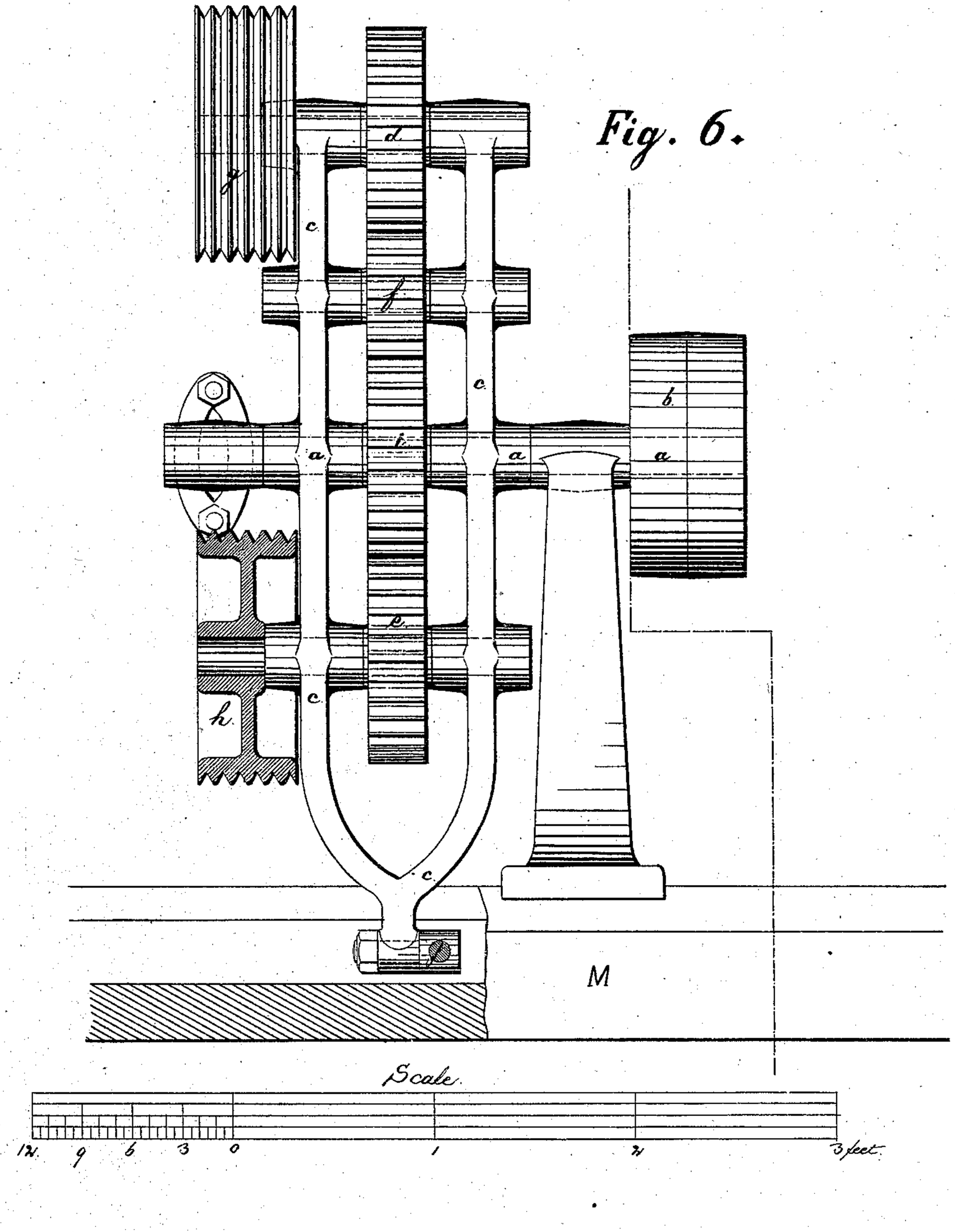
6 Sheets--Sheet 6.

G. FRITZ.

Rolling Mills.

No. 133,771. Patented Dec. 10, 1872.

Fig. 6.



Inventor.

George Fritz

UNITED STATES PATENT OFFICE.

GEORGE FRITZ, OF JOHNSTOWN, PENNSYLVANIA.

IMPROVEMENT IN ROLLING-MILLS.

Specification forming part of Letters Patent No. **133,771**, dated December 10, 1872.

To all whom it may concern:

Be it known that I, GEORGE FRITZ, of Johnstown, in the county of Cambria and State of Pennsylvania, have invented certain Improvements in Rolling-Mills for rolling steel and iron in every form, of which the following is a specification:

The first part of my invention relates to feeding-rollers, driven by friction or otherwise, on a movable table, which is raised and lowered by hydraulic or other power and which carries the metal to be rolled, said driven rollers feeding the metal into the rolling-mill on one side, taking it out on the other side, and drawing it clear from the mill rolls and guides, and then returning it in the same manner, thus passing the metal back and forth as the tables are elevated and lowered until the process of reduction is completed, said feeding-rollers being combined with and moved by a shaft-operating gear and friction-wheels, which are supported by and attached to a yoke suspended in such manner that the friction-wheels connected with it may be brought in contact with or detached from a friction-wheel operating the feed-rollers, by a slight movement of levers in front and rear of the machine. The second part of my invention relates to the combination and arrangement of turners and shifters, of inclined or other suitable form, connected with a carriage running beneath the movable feed-tables in such a way that when the said tables are lowered the turners and shifters project between and above the feed-rollers and turn over or partially over the piece of metal being rolled. The said turners and shifters may also be moved by hydraulic or other power back and forth between the feed-rollers and placed in any desired position with reference to the piece of metal being rolled, in such manner as to adjust it properly for entering the mill-rolls. The steel points in the top of said turners and shifters and on their inclined sides, together with such motion as may be communicated to them at will through the piston or other suitable apparatus for moving the carriage, effect the purpose of turning and adjusting the piece of metal as aforesaid.

Figure 1 is a front elevation of a train of three high rolls and appurtenances. Fig. 2 shows the end elevation of the same with movable tables at front and rear. Fig. 3 is a plan of the same. Fig. 4 is a plan, on an enlarged scale, of a part of one table, showing the arrangement for moving the feed-rollers. Fig. 5 is a side view of a part of one of the tables and its extreme upper and lower positions, with elevations of the gearing and friction-wheels employed to drive the feed-rollers. Fig. 6 is a front elevation of the yoke carrying the gear and friction wheels for operating the feeding-rollers.

The same letters refer to like parts in the drawing.

The housings K K carry the mill-rolls L L′ and L″ in the usual manner, and rest on the shoes or bed-plates M. The top and bottom rolls may be movable vertically in the housings, or they may be stationary and the middle-roll may be movable, or all the rolls may be stationary, or all movable, my invention applying to all these cases. The feeding-tables N and N′, as shown, are raised and lowered by hydraulic cylinders operated by the rods F and F′, and are guided by the arms O and O′, and the guides P and P′. The tables may, however, be arranged and operated in any other suitable manner. *a a* are shafts, driven by means of the pulleys *b b*. These shafts may be driven by any other suitable means, by power derived from the engine that drives the mill-rolls, or from any suitable line of shafting or engine. The shafts *a a* are driven in the direction indicated by the arms in Figs. 2 and 5, and upon said shafts are swiveled the yokes C C. These yokes C C carry the gear-wheels *d d e e*, the idler-wheels *f f*, and the friction-wheels *g g h h*, shown in Figs. 1, 2, 5, and 6. The gear-wheels *i i* are fast on the shafts *a a*, and by the arrangement of the wheels *d e f* drive the friction-wheels *g g h h* in the directions indicated by the arms in Fig. 2. The yokes C C are connected by the rod *j* with the rock-shafts *k l*, upon which are keyed the levers *m m*. The friction-wheels *n n* are fast on the shafts *o o* on the feed-tables, upon which shafts are also fastened the feed-rollers *p p* and the gear-wheels *q q*. The other rollers, *r r r*, on the feed-tables, are fast on the shafts *s s s*, as are also the gear-wheels *t t t*, and all of these gear-wheels are connected with

each other as well as with the gear-wheels *q q*, by the idler-wheels *u u u*, in such manner that when the shafts *o o* are revolved in any direction, all the rollers on the feed-tables will revolve in the same direction. This revolution is effected by throwing the friction-wheels *n n* in contact with the friction-wheels attached to the yokes C C, which may be done by moving the levers *m m* on either side of the train. The feed-rollers *r r r* are mounted, as before explained, on movable tables, (see Figs. 2 and 3,) which lift and let down alternately the piece of metal to be rolled, from the position indicated by the line *v v* in Fig. 2 (said line corresponding to the lower passes) to the position where the tables are represented in Fig. 2, corresponding with the upper passes. The upper and lower positions of the table are also shown by Fig. 5.

The above-described arrangement renders it easy, by moving one of the levers on either side of the train, to feed the piece of metal on the table into the rolls, and to withdraw it far enough from the rolls to let the tables go up and down without hindrance. *w w* are plates fastened in front of the rollers to protect them from injury by the piece of metal when it is leaving the rolls.

The operation is as follows: The ingot or piece of metal to be rolled having been placed on the feed-rollers *p r r r* on the front table N′, the table being in its lowest position, (see Figs. 5 and 2,) and the feed-rollers not being in motion, the workman moves the lever *m* in such manner that the constantly-moving lower friction-wheel *h* comes in contact with the friction-wheel *n*, thus starting the friction-wheel *n* and all the feed-rollers connected with it. The feed-rollers thus carry the piece of metal between the lower and middle mill-rolls L′ L″, by which it is rolled and carried through to the back table N, which is also in its lowest position. The feed-rollers on the table N are then set in motion in the same direction by means of the lever *m*, and carry the piece of metal to its proper position on the table N. The workman then moves the lever *m* into a central position, and so stops the feed-rollers. The tables N and N′ are then raised to the upper position, shown in Fig. 2. The workman then moves the lever *m* in such manner as to bring the constantly-moving upper friction-wheel *g* into contact with the friction-wheel *n*, thus starting the feed-rollers on the table N in the opposite direction to that in which they previously moved, thereby carrying the piece of metal between the upper and middle mill-rolls L′ and L″. This operation is repeated as often as desired.

In some cases it may not be necessary to operate the feed-rollers by power when they receive the piece of metal from the mill-rolls, but only to operate them by power when they carry the piece of metal into the mill-rolls. In such cases the speed of the mill-rolls should be sufficient to throw the piece of metal out so far that the table can be raised without hindrance. The motion of the feed-rollers need not in such cases be reversed by moving the lever *m;* but they may be driven only at the time and in the direction necessary to feed the piece toward the mill-rolls.

It will be observed that the combination of the movable table with the driven rollers is found in my invention, whether said driven rollers are reversed or driven in one direction only.

The arrangement for turning and shifting the piece to be rolled is as follows: A A A, Figs. 1 and 3, are one or more pieces of metal, with or without inclined sides, projecting upward, which, for the purpose of this specification, I call turners and shifters. B B B is a carriage traveling beneath the feed-tables, with which carriage the turners and shifters are connected, and by which they are operated. C is a hydraulic cylinder, connected by a piston-rod with the carriage B B B, and furnishing its motive power. Any other suitable means may be employed to move this carriage. D D D are one or more steel points upon the turners and shifters A A A. The turners and shifters may also be used without these steel points.

The operation is as follows: When the piece of metal needs to be shifted or turned laterally the turners and shifters are run into such a position under the table (the table then being in its upper position) that when the table is let down the steel points D D D engage the piece, causing it to turn over, which being done the piece glides down the turners and shifters until it falls on the table where it is wanted, or, by moving the carriage, the piece is moved laterally into its proper position to be fed into the rolls again. The turners and shifters are then withdrawn and the feed-rollers again set in motion, as aforesaid.

In some cases I prefer to place and operate the turners and shifters above instead of under the movable table.

Claims.

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

1. The combination, in a rolling-mill for rolling steel and iron, of movable tables for supporting and carrying the piece to be operated upon, with driven feed-rollers in said movable tables, whether said driven feed-rollers are reversible or non-reversible, substantially as set forth.

2. The combination of rods *j j* and levers *m m* with the yokes *c c*, in such manner that the driven feed-rollers in the movable tables may be set in motion by means of either of the levers *m m*, thus enabling men on opposite sides of the train to start the driven feed-rollers in motion or to assist each other.

3. The arrangement and combination of the

yoke and the gear-wheels and friction-wheels supported by the yoke, substantially as set forth.

4. The combination of one or more upright turners and shifters with a movable table or tables, and operated by hydraulic or other power, substantially as set forth.

5. I claim the arrangement and combination, in a rolling-mill, of the yokes with their attachments, the movable tables containing driven rollers with their attachments, and the turners and shifters with their attachments, substantially as set forth.

GEORGE FRITZ.

Witnesses:

ISAAC E. CHANDLER,
CYRUS ELDER,
A. MONTGOMERY.