No. 661,877 Patented Nov. 13, 1900.

J. KENNEDY.

ROLLING MILL FEED TABLE.

(Application filed Feb. 17, 1899.)

(No Model.) 4 Sheets—Sheet 1.

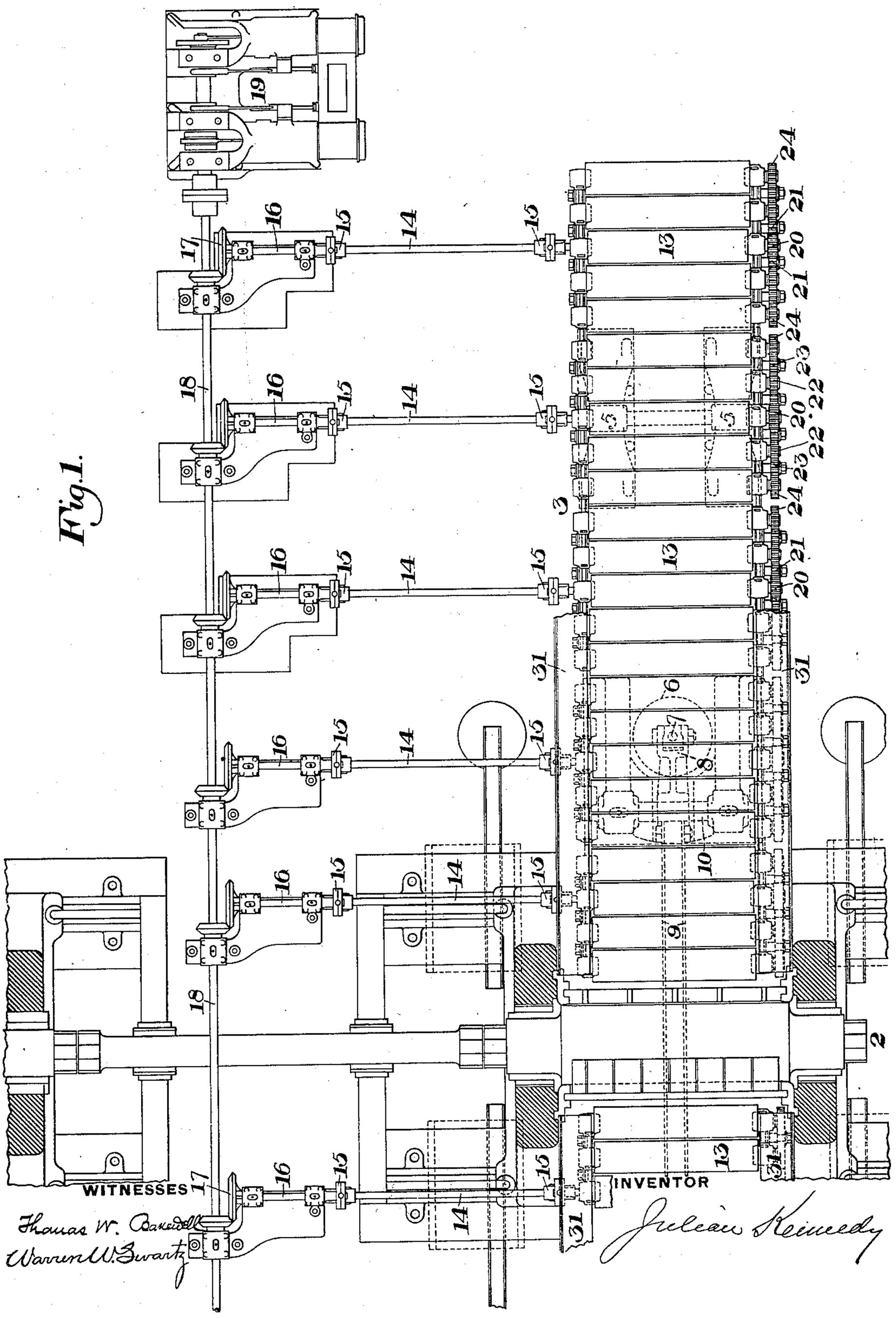

Fig. 1.

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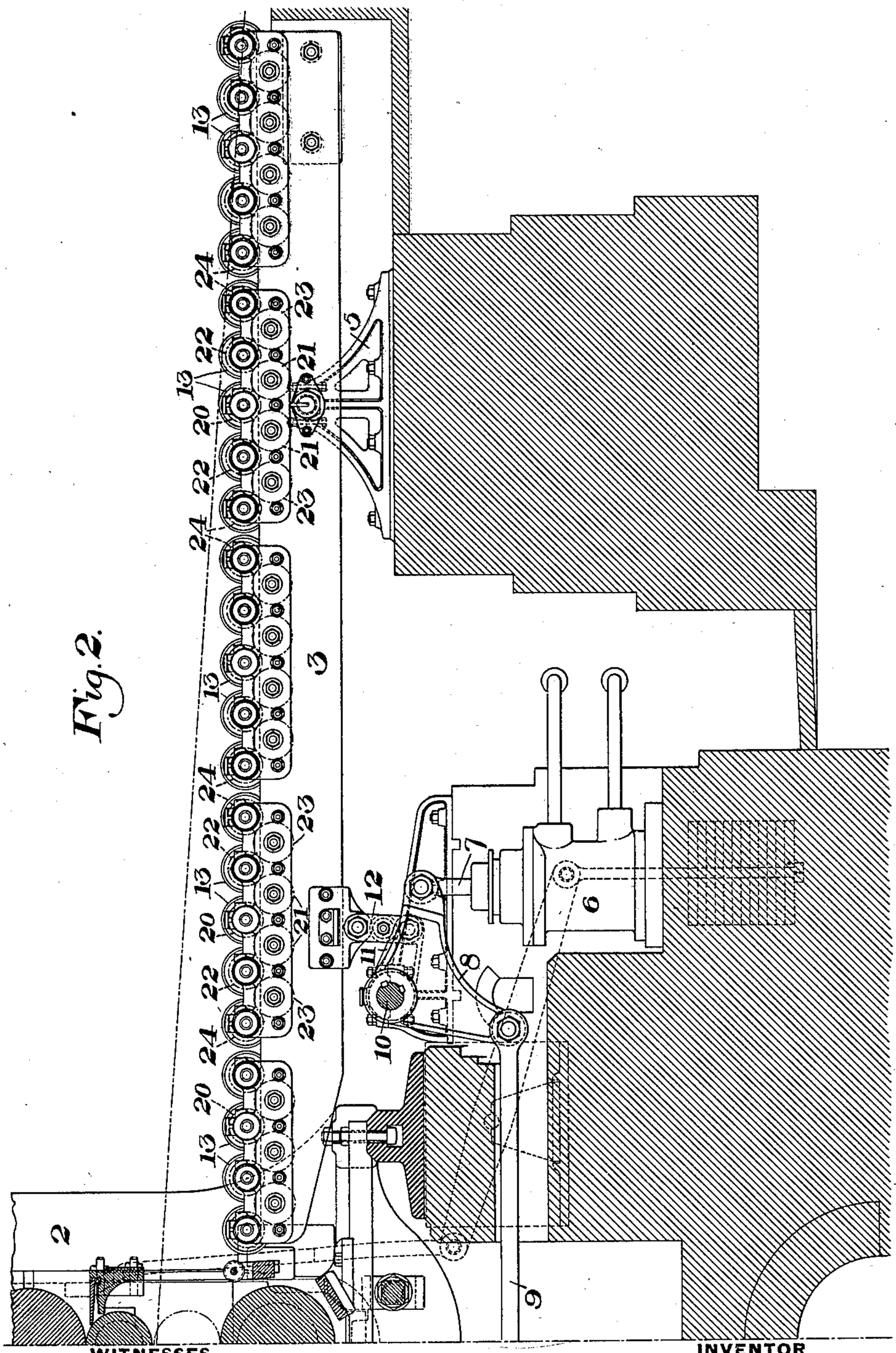
(No Model.) 4 Sheets—Sheet 2.

Fig. 2.



WITNESSES

Thomas W. Bakewell

Warren W. Swartz

INVENTOR

Julian Kennedy

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(No Model.) 4 Sheets—Sheet 3.

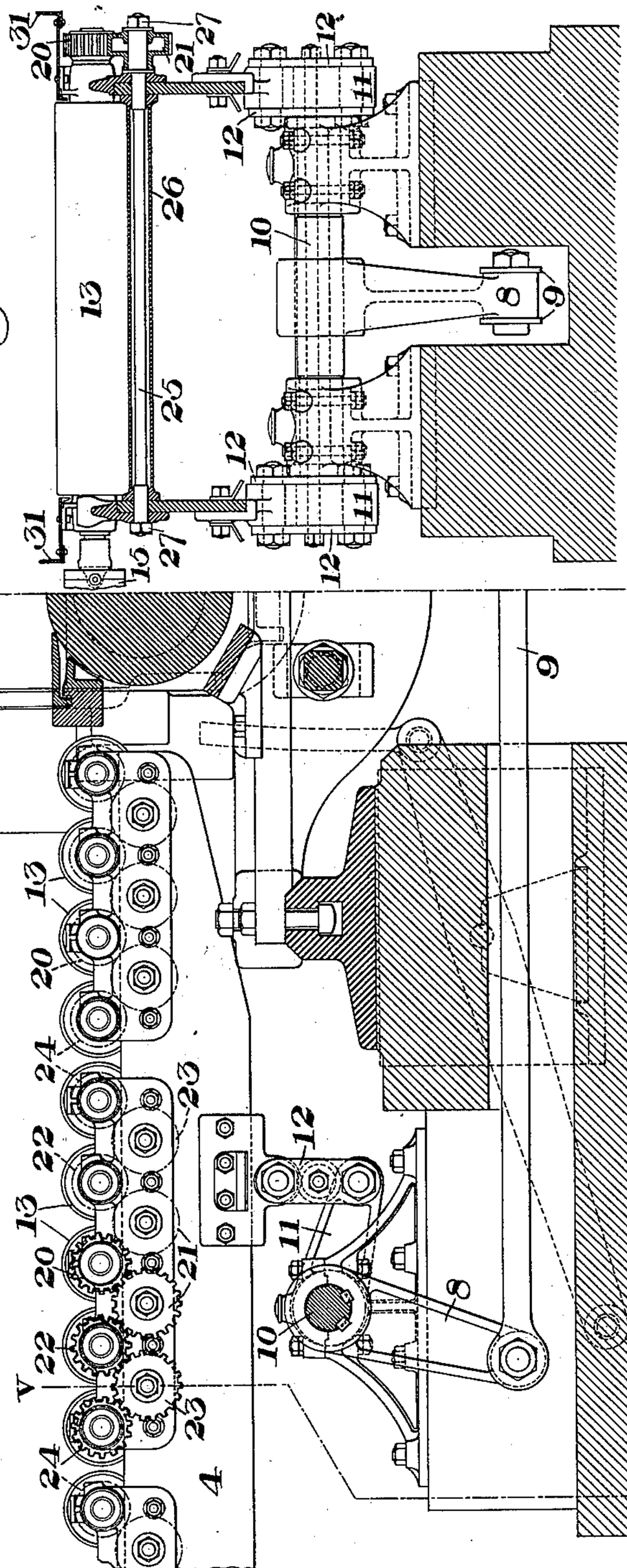

Fig. 5.

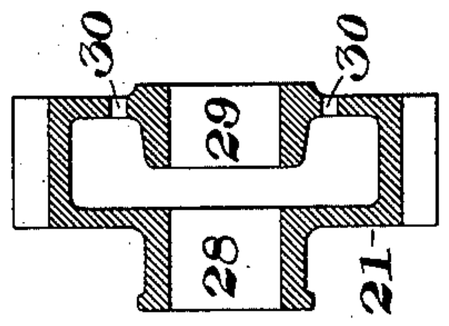

Fig. 6.

Fig. 3.

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INVENTOR

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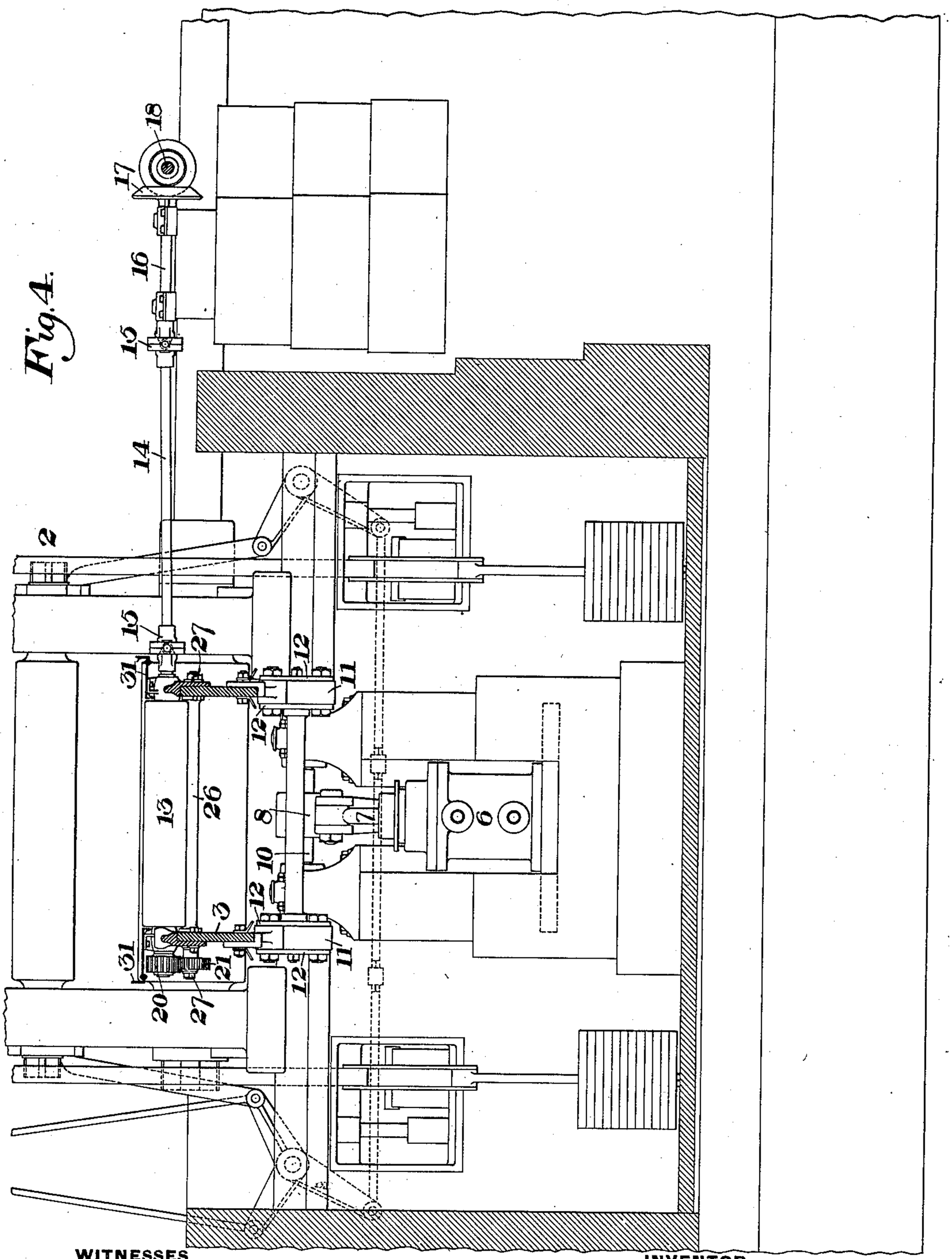
Fig. 4.



WITNESSES

Thomas W. Bakewell

Warren W. Swartz

INVENTOR

Julien Kennedy

UNITED STATES PATENT OFFICE.

JULIAN KENNEDY, OF PITTSBURG, PENNSYLVANIA.

ROLLING-MILL FEED-TABLE.

SPECIFICATION forming part of Letters Patent No. 661,877, dated November 13, 1900.

Application filed February 17, 1899. Serial No. 705,797. (No model.)

To all whom it may concern:

Be it known that I, JULIAN KENNEDY, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Rolling-Mill Feed-Tables, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a partial plan view, partly broken away, showing a set of rolls provided with my improved tables. Figs. 2 and 3 are partial side elevations showing the tables on opposite sides of the rolls. Fig. 4 is a cross-sectional view showing the actuating connections. Fig. 5 is a cross-section on the line V V of Fig. 3, and Fig. 6 is a detail cross-section of an idler-pinion used upon the feed-table.

My invention relates to that class of rolling-mill feed-tables which are raised and lowered to feed the metal to or receive it from passes arranged in different horizontal planes; and its object is to improve the driving connections for the feed-table rollers as well as the construction and arrangement of the rollers and the means for raising and lowering the table.

In the drawings, 2 represents a three-high stand of rolls having tilting feed-tables 3 and 4, located on opposite sides thereof. As these feed-tables and their connections are the same in construction, I shall describe the table 3 and its connections, the same description applying to table 4. The table 3 is trunnioned upon a suitable base 5 in the usual manner and is raised and lowered by a hydraulic cylinder 6, whose piston-rod 7 is pivotally connected with a bell-crank lever 8. To the lower arm of the bell-crank lever is applied a connecting bar or rod 9, which is similarly coupled to the corresponding bell-crank lever of the opposite table 4, so that the tables will rise and fall in unison. The shaft 10, to which the bell-crank lever is keyed, is provided with projecting arms 11, which are connected with the side members of the feed-table frame by short pivotal links 12. As the levers 8 are mounted closely beneath the front ends of the tables and the connecting-links are short, the necessity for guideways to insure the correct vertical movement of the table is done away with and there will be no sagging or canting of the table sidewise owing to the short and direct connection between the actuating-levers and the table. The feed-rollers 13 of this table are arranged in groups, with preferably five in a group, with the exception of the group nearest the rolls, in which there may be four. One roller of each set is driven directly by means of a tilting shaft 14, coupled to the projecting end of the roller and having universal joints 15 at each end thereof. Each of these tilting rotatory shafts 14 is connected by its universal joint to a stationary short shaft 16, connected by bevel-gear 17 to the shaft 18, which is common to all and is driven by a suitable engine 19. The roller to which the shaft 16 is connected is mounted so as to allow a short endwise movement corresponding to the versed sine of the arc through which this part of the table swings. To the protruding end of the opposite trunnion of each feed-roller thus directly driven is secured a pinion 20, having wide teeth and which intermeshes with idler-pinions 21, which engage pinions 22 upon the shafts of the next adjacent rollers, the pinions 22 engaging idlers 23, which drive the pinions 24 of the outer rollers of each group. The idler-pinions are supported upon shafts 25, which extend through the side plates of the table-frame and through a spacing-sleeve 26 and are provided with nuts 27 at their outer ends, the shaft thus acting as a through-bolt for the table. The idler-pinions are preferably cast hollow, with inner and outer bearing-sleeves 28 and 29, and with holes 30 leading into the interior cavity. By this construction oil may be supplied to the interior of the hollow pinion, and this will gradually work out along the bearings and provide a continuous supply of lubricant.

At each side of the feed-table are secured guard-plates 31, having upwardly-projecting flanges at their outer edges, these plates covering the pinions and trunnions of the rollers and preventing scale or other matter from dropping into and clogging these parts.

The advantages of the invention will be apparent to those skilled in the art. By using the stationary bevel-gears having flexible connection with the table-roller much larger and stronger gears can be used than where they are located upon the table, while the power is

evenly distributed throughout the rollers. By using the groups of rollers with idler connections between the directly-driven roll and the others of the group a simple and effective driving connection is obtained for the rollers. The mounting of the idlers upon the through-bolts prevents the shaking loose of these rollers, which frequently occurred where they were mounted on short stub-shafts. The placing of the bell-cranks closely adjacent to the feed-table, with the short connecting-links, enables me to do away with the usual guideways for the table, and thus cheapen the construction and lessen the friction.

Many variations may be made in the form and arrangement of the connections between the short counter-shafts and the table, as well as in the other parts, without departing from my invention, since

I claim—

1. The combination with a vertically-movable feed-table, having rollers, of a series of tilting rotary shafts connected to and arranged to drive said rollers, and a common shaft mounted in stationary bearings independent of the feed-table arranged to drive said tilting shafts; substantially as described.

2. The combination with a vertically-movable feed-table having rollers thereon arranged in groups, of tilting rotary shafts, each connected to and arranged to drive the rollers of one group, and connected mechanism independent of the table arranged to drive the tilting shafts, substantially as described.

3. The combination with a vertically-movable feed-table having rollers arranged in groups, of a shaft extending alongside the table in stationary bearings, tilting shafts having bevel-gear connections with the said shaft, each tilting shaft being connected to one roller of each group, and actuating connections between said roller and the other rollers of each group; substantially as described.

4. A rolling-mill feed-table having positively-driven rollers, and provided with longitudinal shields covering the trunnions of the rollers and also their driving mechanism; substantially as described.

5. The combination with a group of rollers mounted upon a pivoted support, of a roller having actuating connections therewith and movable endwise in its supporting-bearings, and a flexible shaft for driving the latter roller connected eccentrically to the pivotal axis of said support; substantially as described.

In testimony whereof I have hereunto set my hand.

JULIAN KENNEDY.

Witnesses:

THOMAS W. BAKEWELL,

H. M. CORWIN.