

(No Model.)

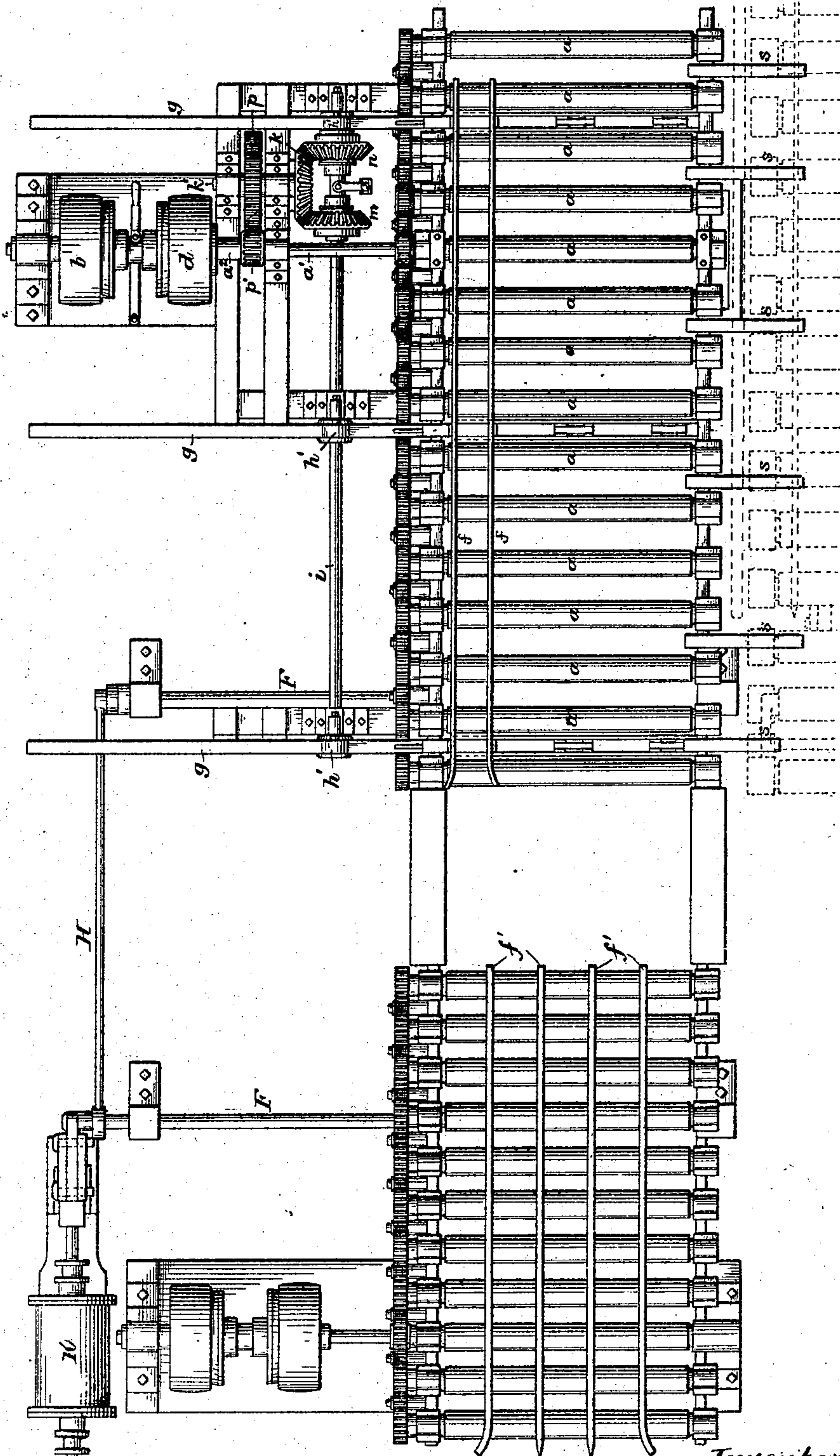
2 Sheets—Sheet 1.

T. J. PRICE.
FEED TABLE FOR ROLLING MILLS.

No. 552,446.

Patented Dec. 31, 1895.

FIG. 1.



Witnesses:
Chas. Amon
Frank E. Bechtold

Inventor:
Thos J. Price
by his Attys Howard & Howard

(No Model.)

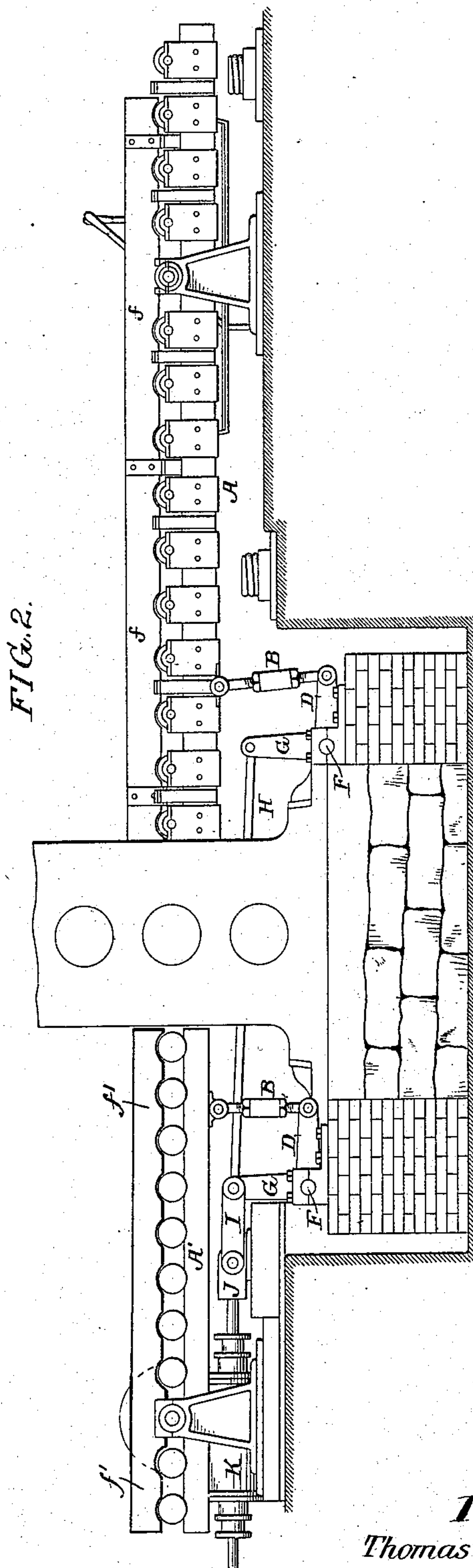
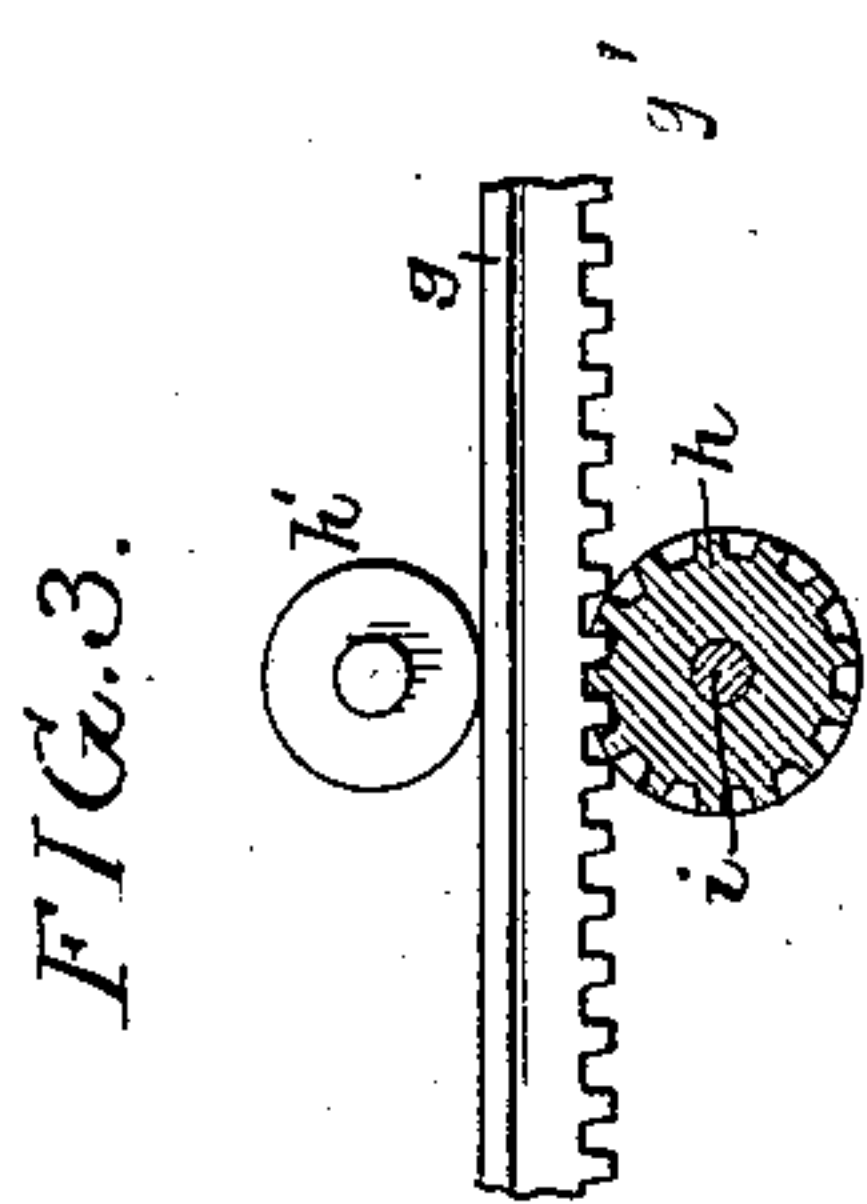
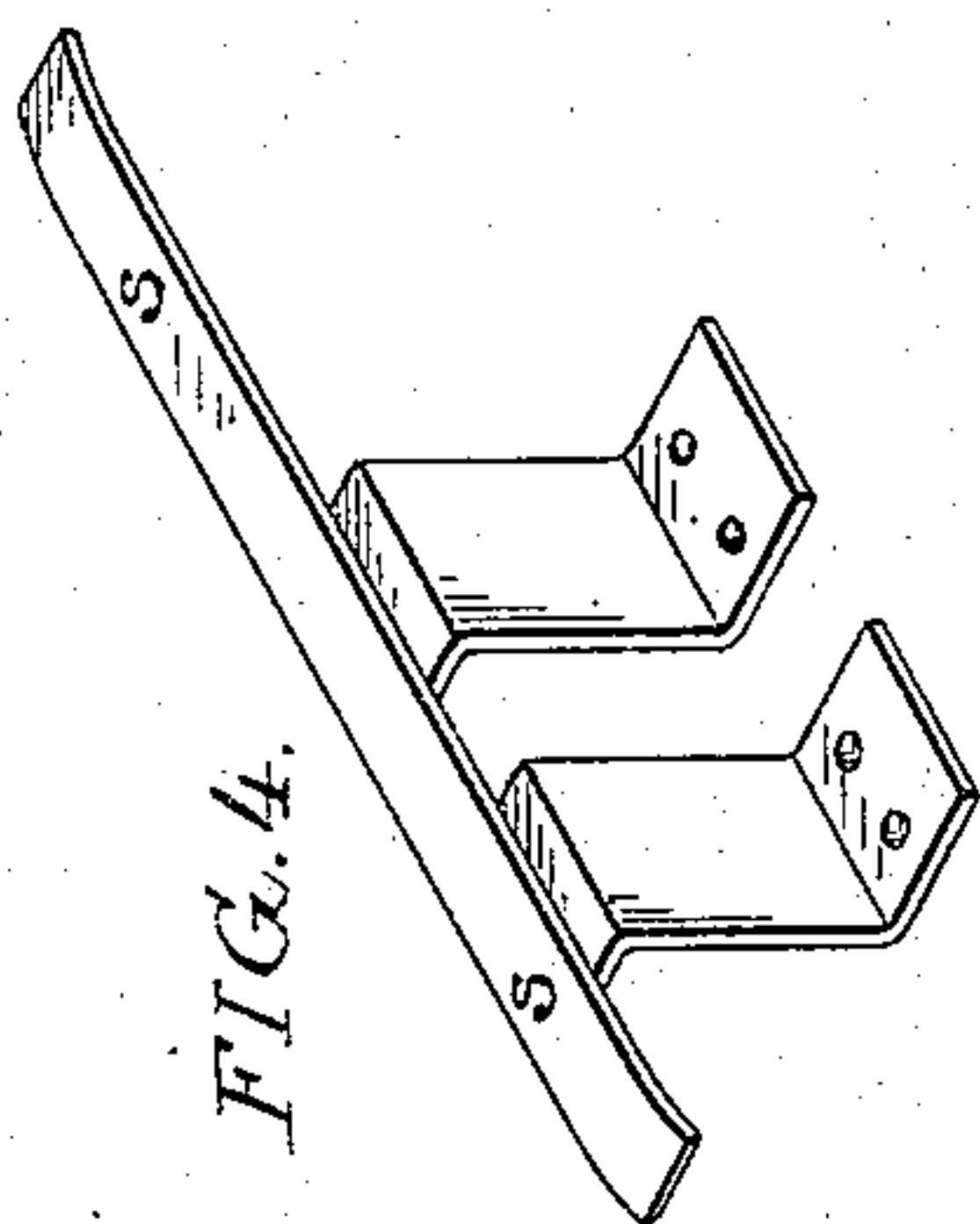
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Frank E. Bechtold

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Thomas J. Price

By his Attys *James & Howard*

UNITED STATES PATENT OFFICE.

THOMAS J. PRICE, OF DANVILLE, PENNSYLVANIA.

FEED-TABLE FOR ROLLING-MILLS.

SPECIFICATION forming part of Letters Patent No. 552,446, dated December 31, 1895.

Application filed April 28, 1894. Serial No. 509,390. (No model.)

To all whom it may concern:

Be it known that I, THOMAS J. PRICE, a citizen of the United States, and a resident of Danville, Montour county, Pennsylvania, have invented certain Improvements in Feed-Tables for Rolling-Mills, of which the following is a specification.

My invention forms an improvement in feed-tables for rolling-mills and similar devices and is particularly adapted to the form of feed-tables set forth in Letters Patent of the United States numbered 441,895, and granted to me December 2, 1890.

As the general construction and arrangement of the table is fully set forth in that patent I will refer to that for such details as are common to both applications, setting forth more particularly in this application the improvements and details wherein my present invention differs from that described in this prior patent.

The object of the present improvement is to produce a pair of co-operating tables located at opposite sides of the roll-train combined with simple means for operating the tables and an extremely simple and effective laterally-adjustable guide to replace the series of guides employed in the patented table. In addition to this, the present invention includes means for readily transferring the bars to the adjacent tables of the neighboring roll-train.

To these and certain other incidental ends and purposes, which will be hereinafter more fully explained, my invention is embodied, combined, and used substantially in the manner hereinafter described, illustrated, and claimed.

As in my former patent, already referred to, the framework of the table is mounted upon trunnions resting in suitable bearings upon which the tables may be tilted or rocked. Each table consists of a series of rollers for feeding the work to and from the roll-train. These rollers are geared together and to a source of power, so that they may be turned alternately in one direction and the other as the bars pass in and out of the roll-train. The tilting frames of the two tables are connected to a single source of power by which the ends of the tables adjacent to the rolls may be raised in position to deliver the work

into the upper pair of rolls on one side and receive it at the other, or may be lowered to co-operate in a similar manner with the lower pair of rolls.

Upon one of the tables is mounted a series of fixed guide-bars corresponding to the different passes of the roll-train, as shown in my former patent. Upon the other table, however, is mounted a single pair of guide-bars forming a guide-trough for receiving and delivering the work to and from one pass of the roll-train. This guide-trough is mounted upon laterally-traveling supports by which it may be moved across the table and brought opposite any one of the passes, so that when the work has been delivered into this trough, say from one of the upper passes, the tables are tilted to bring them opposite the lower rolls and the guide-trough is simultaneously, if desired, shifted to the next pass. The work is then run through the rolls, the tables tilted, and the work run back through the upper pass, when the guide-trough is again shifted as before. After the bar or other work has been run through all the passes of the roll-train it is received on the rollers of the table at one side of the guide-trough, instead of between the guides, and the guide-trough is then moved across the table, pushing the bar before it onto the table of the adjacent roll-train. For this purpose I provide slides bridging over the space between the two tables and supporting the bar while it is sliding from one to the other. In addition, therefore, to acting as a guide-trough, my adjustable guides serve also the purpose of a pusher to deliver the work from one set of roll-train and tables to the next.

Such briefly is my invention. The details and operation of the several parts will be better understood from reference to the accompanying drawings, though it must not be understood that my invention is limited to the precise details shown.

Figure 1 is a plan view of rolling-mill housings and feed-tables illustrating my present invention. Fig. 2 is a side view of the same. Fig. 3 is a transverse section, on an enlarged scale, of part of the device, and Fig. 4 is a perspective view of another element of the device.

Like letters of reference indicate like parts.

The general construction of the table is similar to that forming the subject of my above-mentioned patent. It consists of a framework trunnioned in suitable bearings and capable of being raised and lowered at the end adjacent to the roll-train. In the drawings I have illustrated only the housings of the roll-train, because the rolls and the mechanism for operating them are not different from those of any ordinary three-high train.

The framework of the table A in front of the rolls carries a series of rollers *a* which serve to support and feed the bar in its passage to and from the rolls. One of these rollers is in line with the trunnions of the frame and is driven by a shaft *a'*, suitable spur-gearing being employed to transmit the movement of this roller to the other rollers of the series. The counter-shaft and bevel-gearing shown in my former patent may of course be used, if preferred.

On the shaft *a'* is a loose pulley *b* and on a tubular shaft or sleeve *a''* surrounding the shaft *a'* is a pulley *d*. These pulleys are driven in opposite directions, in any desired manner—as, for instance, by means of straight and crossed belts—and either of them at will may be connected with the shaft *a'* by means of an interposed duplex clutch, as shown, which can be thrown into engagement with either pulley or out of engagement with both, thereby driving the rollers of the feed-table forward or backward or stopping them, as desired.

Above the feed-rolls *a* travels my adjustable guide-trough *f* composed of a pair of guide-bars held at the required distance apart. From this guide-trough project the series of arms *g*, each of which carries on the underside a rack *g'*, as shown in Fig. 3. The racks engage spur-pinions *h* carried by a shaft *i* which turns in suitable bearings at one side of the table, and may be held in engagement with said pinions by means of antifric-tion-rollers *h'* bearing upon the backs of the racks.

Loosely turning upon the shaft *i* between suitable collars are two bevel-pinions *m* and *n*, either of which may be clutched to the shaft by an interposed duplex clutch similar to that employed in connection with the driving-pulleys *b* and *d*. These pinions mesh with and receive motion from bevel-wheel *k* carried by a short shaft *k'*, which in turn has a spur-wheel *p* meshing with a pinion *p'* secured to the sleeve or hollow shaft *a''*, carrying and turning with the driving-pulley *d*. Continuous rotation is therefore imparted to the bevel-wheel *k*, and the shaft *i* may be driven thereby in either direction at will or may be stopped by means of the duplex clutch and the bevel-gears *m* and *n*. Provision is thus had for giving lateral travel to the guide-trough across the table in either direction, and thereby bringing it readily opposite or into range with the dif-

ferent passes of the roll-train to properly feed the bar to or receive it from the rolls. After the bar has been through all of the passes of the roughing-rolls it becomes necessary to remove it from the table A and transfer it onto the rollers of the feed-table of a second train, where the operation of reduction is continued. Part of these rollers are shown in dotted lines in Fig. 1. To accomplish this I mount upon the outer side of the frame of the table a series of projecting bars or shoes *s*, level with the tops of the rollers *a*. Before the final backward pass of the bar the feed-trough *f* is retracted, so that the bar may be delivered onto the rollers *a* in front of the feed-trough. On being again projected the trough will now act as a pusher and slide the bar over the shoes *s* directly into the trough of the neighboring feed-table, which is, as shown in dotted lines, in position to receive it.

At the left of Fig. 1 it will clearly be seen that the table co-operating with the first table already described and located at the opposite side of the rolls is provided with stationary guides *f'*. Between successive pairs of these guides the bars are received from the guide-trough *f* and delivered back into it when the tables have been tilted to the other pass of the three-high rolls. The feed-rollers of this rear table may be driven in a manner substantially the same as the rollers *a*, and I will not therefore repeat these details.

At K is shown a steam or hydraulic cylinder for simultaneously tilting or rocking the tables to deliver the bars to and receive them from the upper or the lower passes of the roll-train. The frames of the tables are supported at the ends adjacent to the roll-train upon adjustable links B secured at their lower ends to the horizontal arms D of rock-shafts F. These shafts are carried in suitable bearings and connected by their other arms G to the head J of the piston-rod of the cylinder K. In the drawings these connections are shown as a pair of rods or links H and I. The vertical play of the ends of the table adjacent to the rolls is just equal to the distance between the upper and the lower passes, so that when the turnbuckles B have been once set to bring the tables in proper relation to one pass they will be properly regulated for all the passes of the roll-train.

I have now described the operation of each part of my device and will briefly explain the joint operation of the whole apparatus.

The pile or billet may be introduced between the first pair of guides upon the left-hand table in the figures, both tables being depressed opposite the lower pass of the rolls. The feed-rolls are then set in motion and the billet run through the first pass between the bottom and intermediate rolls, and delivered into the feed-trough *f* of the right-hand table, then in position to receive it. The feed-rollers may then be stopped, while the tables are

rocked and the feed-trough adjusted, simultaneously, to bring the end of the billet or bar opposite the second pass between the upper and intermediate rolls. The guide-rollers are then set in motion in the opposite direction, feeding the bar through the rolls back to the left-hand table. The tables are then again tilted and the feed-rollers reversed, feeding the bar back through the lower pass into the feed-trough *f*, which has remained in position to receive it, and so on, successively until the bar is in the last pair of guides on the left-hand table. Before the bar is returned to the rollers *a* the guide-trough *f* is drawn back so that the bar will not be fed into it. When, therefore, the rollers *a* have been brought to rest, the guide-trough may be advanced into contact with the bar and used as a pusher to slide the bar across the shoes *s* onto the table of the adjacent roll-train.

I have now set forth in full one embodiment of my invention and the manner in which it may be employed. I have purposely omitted the enumeration of many modifications which may be made without departing from the principles involved, because to set these forth at length would obscure rather than make clear the more essential features. I have also left the matters of detail as much as possible to be provided for as each case may require.

I claim, however, and desire to secure by these Letters Patent of the United States, together with all such modifications and additions as may be made by mere skill in the art, and with only the limitations and restrictions expressed or necessarily implied, the following:

1. In combination with a rolling mill table, a laterally traveling guide trough mounted on said table, driving racks, pinions, and shaft therefor, and means for rotating said shaft at will in either direction, substantially as and for the purpose set forth.

2. In combination in a rolling mill table, a series of co-operating feed rollers, a driving shaft for the primary roller of the series, means for rotating the said shaft at will in either direction, a laterally traveling guide trough mounted above the said rollers, arms projecting from said guide trough and provided with racks, driving pinions therefor, and a duplex clutch and connections for transmitting power at will from the said driving shaft, in either direction, to the said racks, substantially as and for the purpose set forth.

3. In combination with the tables of adjacent roll trains, a laterally traveling guide trough mounted upon one of the said tables, means for giving motion to the said guide trough, and projecting bars or shoes forming a support or slide between the said tables, whereby the said guide trough in conjunction with the said shoes may be used to push the rolled bar or other work from one table to the other, substantially as and for the purpose set forth.

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

THOMAS J. PRICE.

Witnesses:

R. M. CATHCART,
ALEX. H. GRONE.