

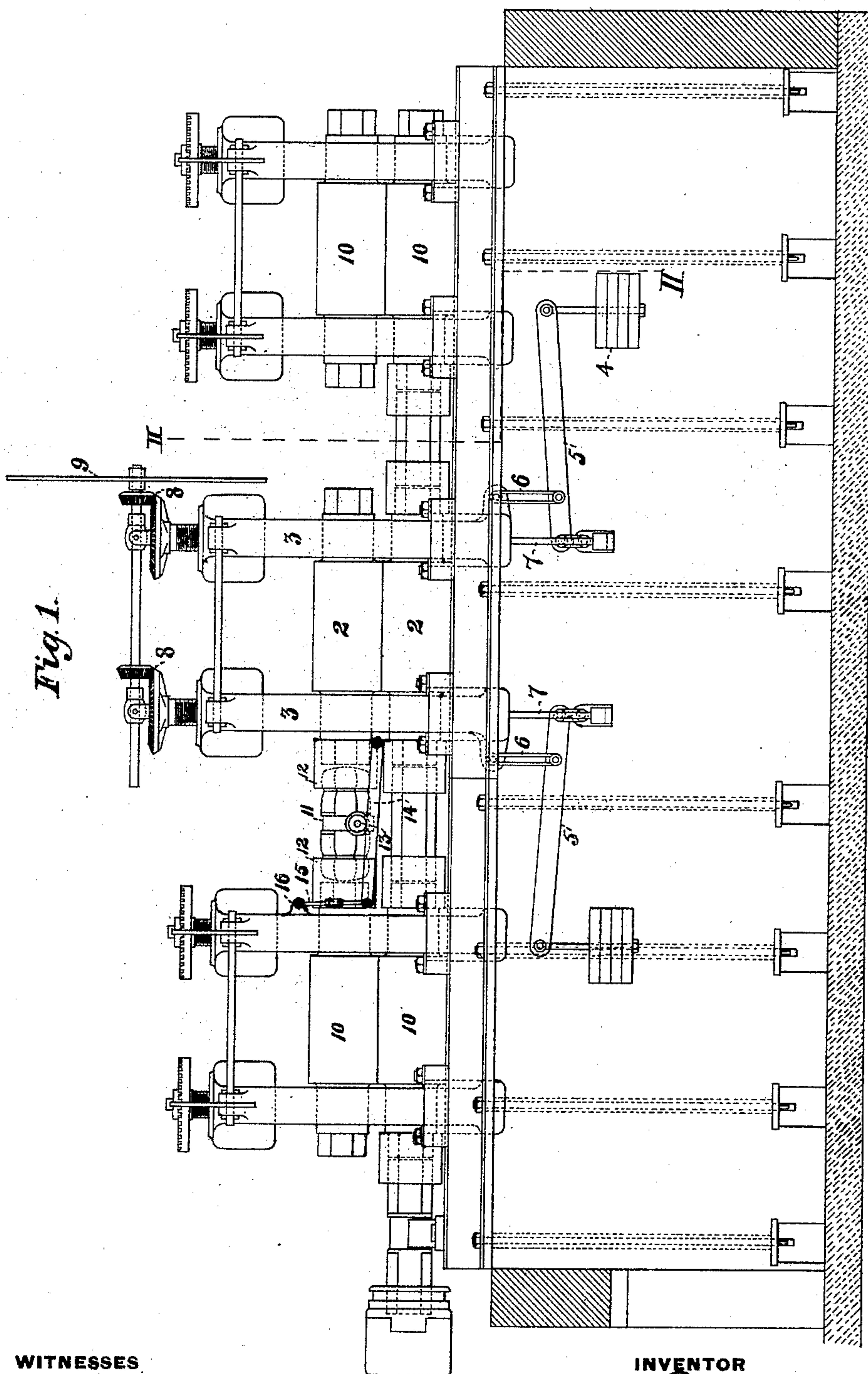
(No Model.)

2 Sheets—Sheet 1.

C. W. BRAY.
ROLLING MILL.

No. 488,935.

Patented Dec. 27, 1892.



WITNESSES

Harren M. Swartz
C. Byrnes.

INVENTOR

Charles W. Bray
by his attorneys
W. B. Ackwell, Sarg.

(No Model.)

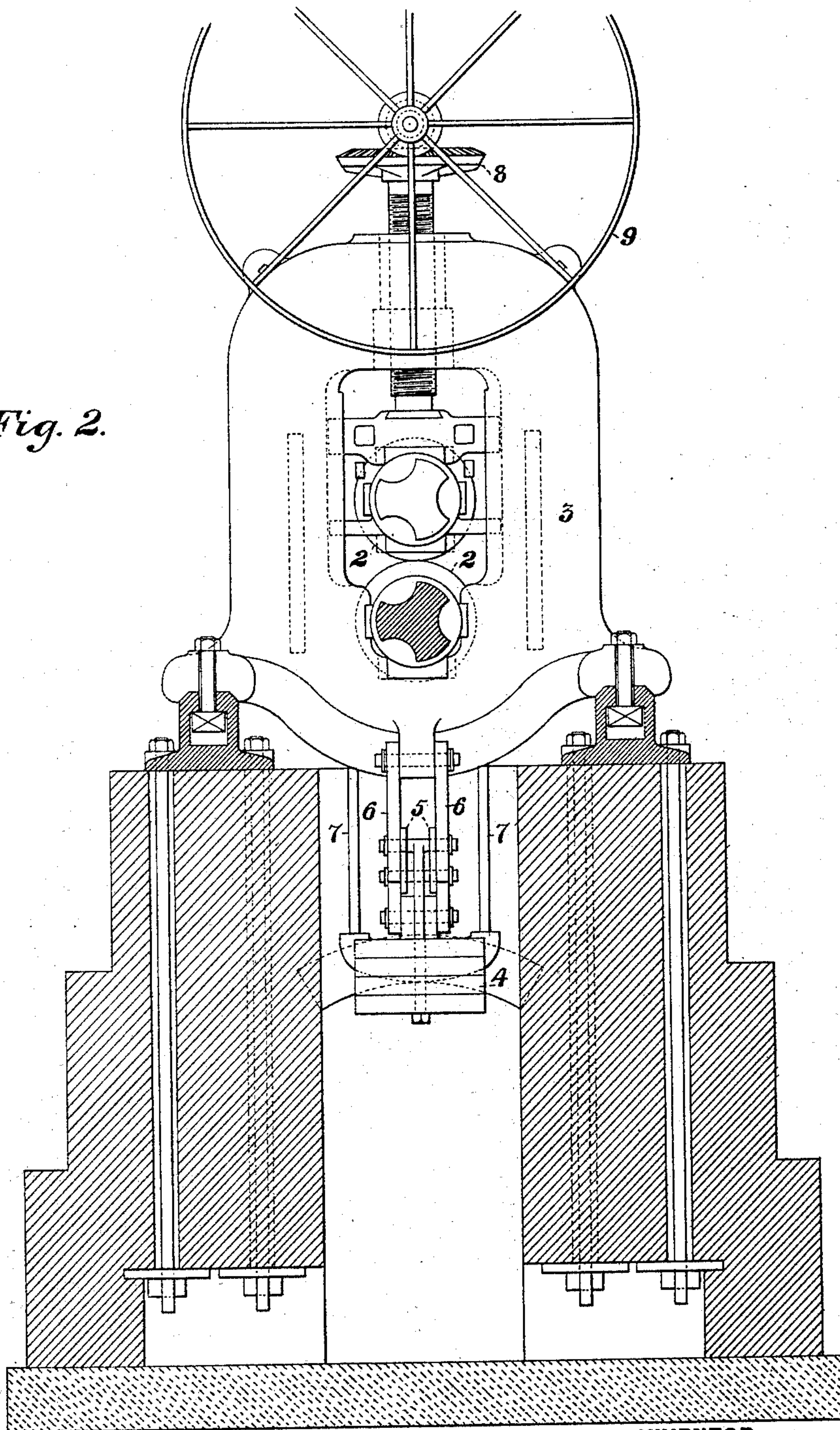
2 Sheets—Sheet 2.

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Fig. 2.



WITNESSES

Harmon St. Swartz
C. Byrnes.

INVENTOR

Charles W. Bray
by his attorneys
N. J. Bakerwell, Secy

UNITED STATES PATENT OFFICE.

CHARLES W. BRAY, OF YOUNGSTOWN, OHIO, ASSIGNOR TO THE LLOYD
BOOTH COMPANY, OF SAME PLACE.

ROLLING-MILL.

SPECIFICATION forming part of Letters Patent No. 488,935, dated December 27, 1892.

Application filed March 24, 1892. Serial No. 426,243. (No model.)

To all whom it may concern:

Be it known that I, CHARLES W. BRAY, of Youngstown, in the county of Mahoning and State of Ohio, have invented a new and useful Improvement in Rolling-Mills, 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—

10 Figure 1 is a front elevation of a sheet or plate mill constructed in accordance with my invention; and Fig. 2 is a cross-section on the line II—II of Fig. 1.

My invention relates to the construction of rolling-mills used for rolling sheets or plates from sheet bars or slabs, and it consists in connecting the roughing-rolls directly to the finishing-rolls, whereby the set of pinions heretofore uniformly employed at one side of the set of balanced roughing-rolls and connected thereto is done away with and the upper roughing-roll driven from the frictionally-driven top finishing-roll, thus greatly cheapening and simplifying the plant.

25 In the drawings, in which similar numerals indicate corresponding parts, 2, 2, indicate the rolls of the roughing set, having the usual housings 3, 3, and the counterweights 4, 4. These counterweights hang at one end of the levers 5, which are hung by links 6 from the housings and are connected at their opposite ends to the rods 7, 7, which carry the upper roll-bearing. These rolls are provided with lowering mechanism, consisting of the bevel-gears 8, 8, and hand-wheel 9, the shafts of the bevel-wheels being screw-threaded as ordinarily. In the same line with the roughing-rolls are mounted the finishing or jump-rolls 10, 10, the lower rolls of all the sets being directly connected as shown and driven positively by an engine connected to one of the lower finishing-rolls. Between the upper roughing-roll and one of the upper finishing rolls is provided a flexible connection consisting of the wabblers 11 entering the sleeves 12, 12, and supported upon a yoke carried by wheels 13, which roll upon bars 14 pivoted at one end to the bearing of the upper roughing-roll and at their other ends to links 15
50 pivoted to lugs 16 projecting from the housing of the finishing-rolls. The upper finish-

ing-roll is driven by frictional contact with the lower roll and the metal, and through the flexible connection drives the upper roughing-roll. In practice this arrangement is found to be efficient in the highest degree, since as the metal is comparatively thin when passing through the jump-rolls, the friction is sufficient to drive the upper roll and through it the upper roughing-roll, which is raised a considerable distance from the lower roll in working, on account of the thickness of the bloom. It is only necessary to keep the top roughing-roll turning until the metal enters, when the bottom roughing-roll will drive it.

The advantages of the device are obvious. The mill is less complicated, takes up less room, and is much cheaper than any former plate-mill constructions.

Many changes may be made in the form of the connection and in the form and arrangement of the other parts of the device without departure from my invention, since

What I claim is:—

1. A sheet or plate mill, having a balanced upper roughing-roll, a frictionally driven upper finishing-roll, and direct flexible connections between the same; substantially as described.

2. A sheet or plate mill, having a set of finishing rolls, means for positively driving the lower finishing roll, a set of roughing rolls, balancing mechanism for the upper roughing-roll, and a flexible connection between the upper frictionally driven finishing and the upper roughing rolls; substantially as and for the purposes described.

3. A sheet or plate-mill having a set of balanced roughing-rolls and one or more sets of finishing-rolls in the same line therewith, direct connections between the lower positively-driven rolls of the finishing and roughing set, and flexible connections between their upper frictionally driven rolls; substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand this 21st day of March, A. D. 1892.

CHARLES W. BRAY.

Witnesses:

HARRY M. KELLY,
G. B. BOOTH.