

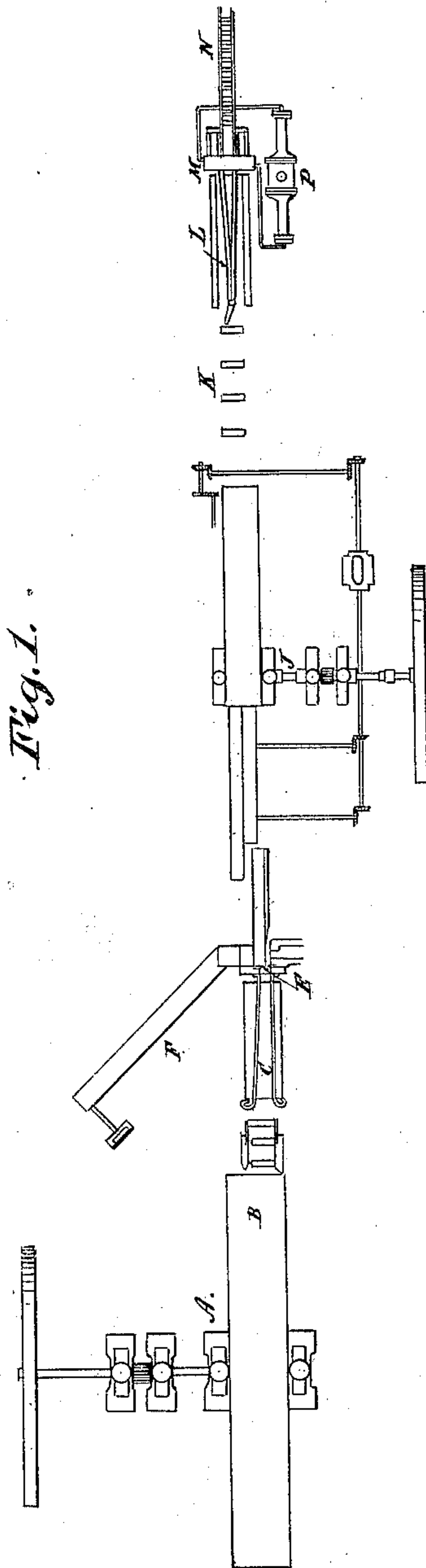
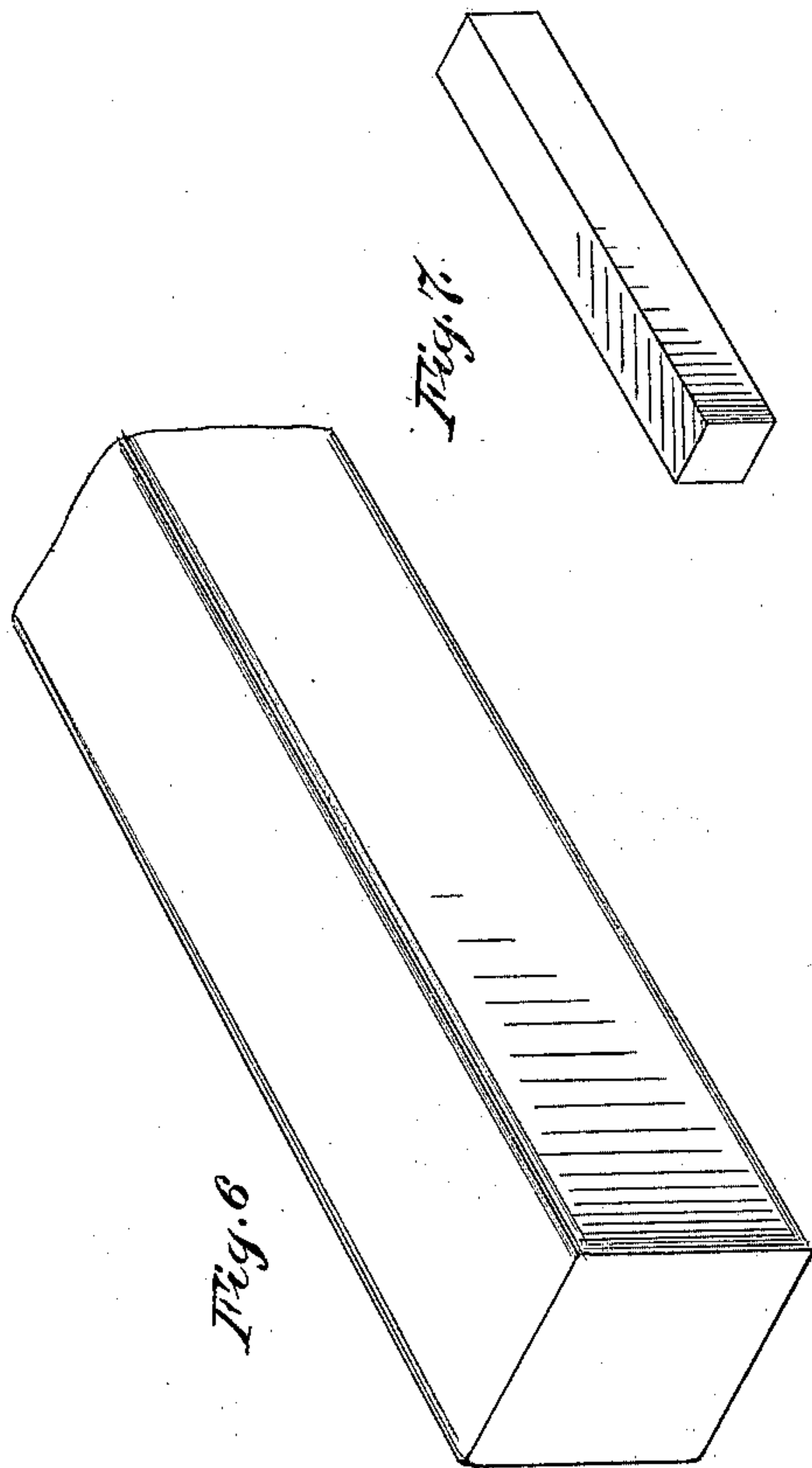
(No Model.)

5 Sheets—Sheet 1.

H. S. SMITH & C. PETTIGREW.  
PROCESS OF AND MECHANISM FOR BILLET FORMING.

No. 416,962.

Patented Dec. 10, 1889.



Witnesses:  
D. W. Gardner  
A. C. F. Farnham.

Inventors:  
H. S. Smith  
Charles Pettigrew  
By their Attorney,  
E. M. Hersh.

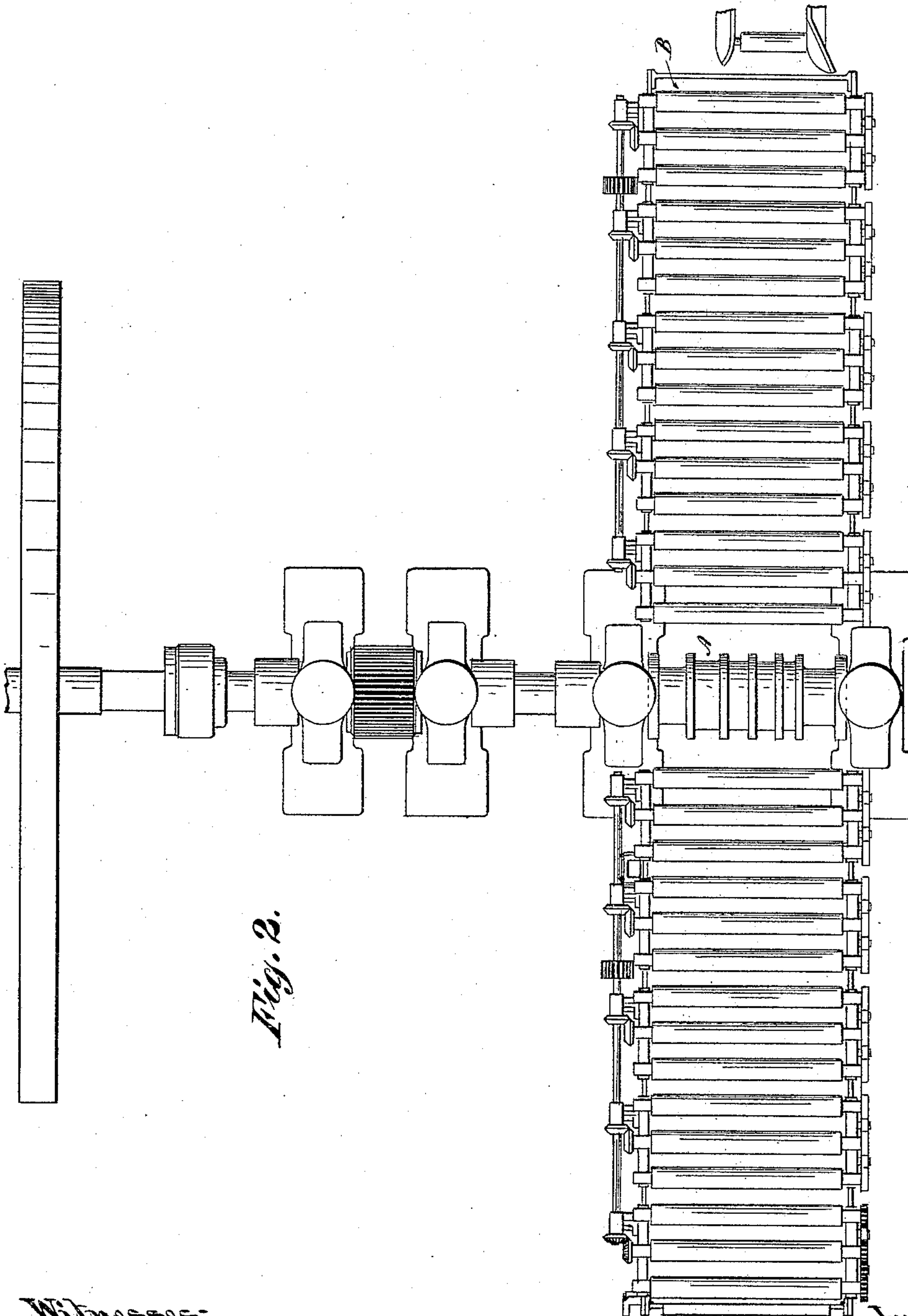
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*Fig. 2.*

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(No Model.)

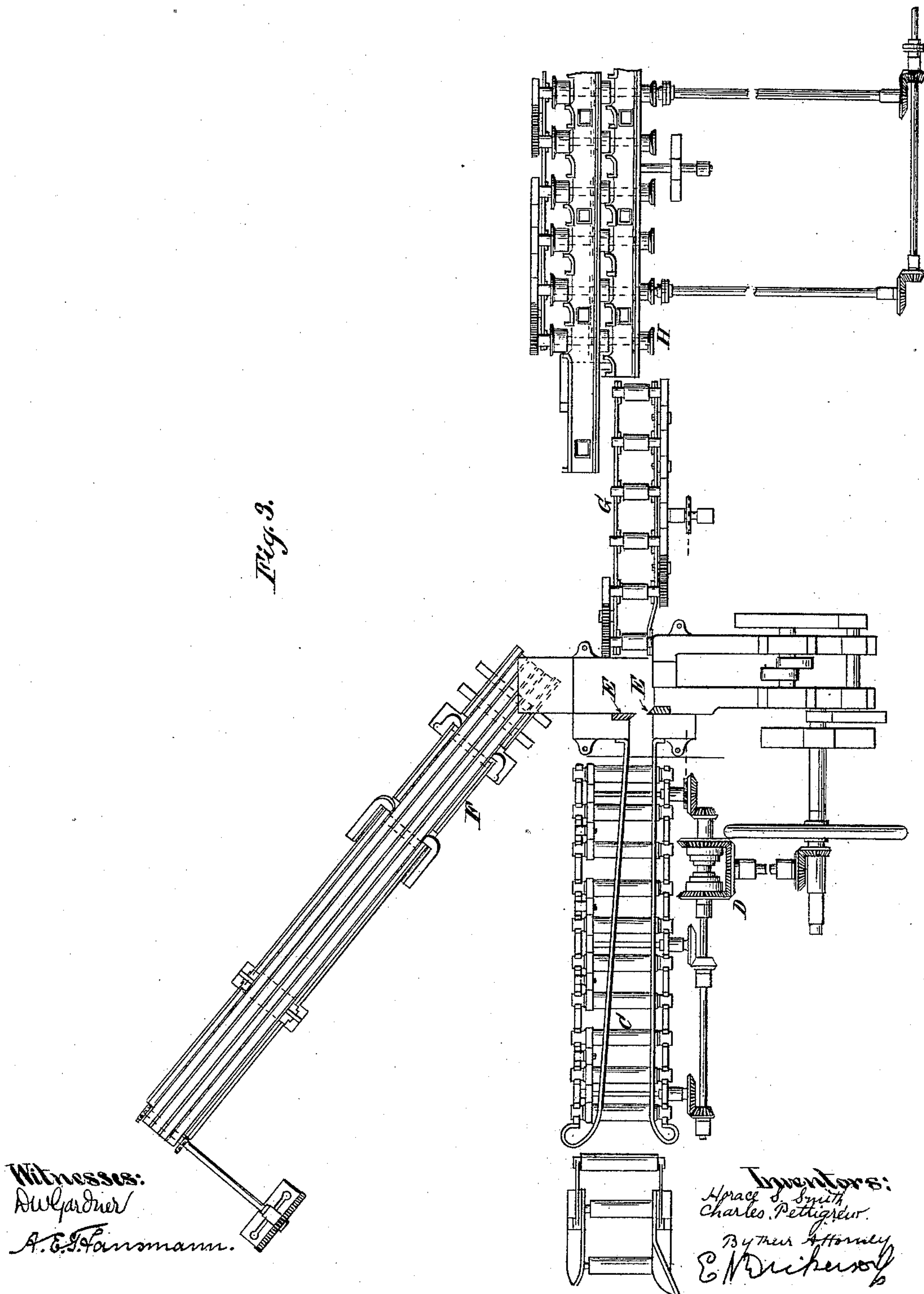
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*Fig. 3.*





(No Model.)

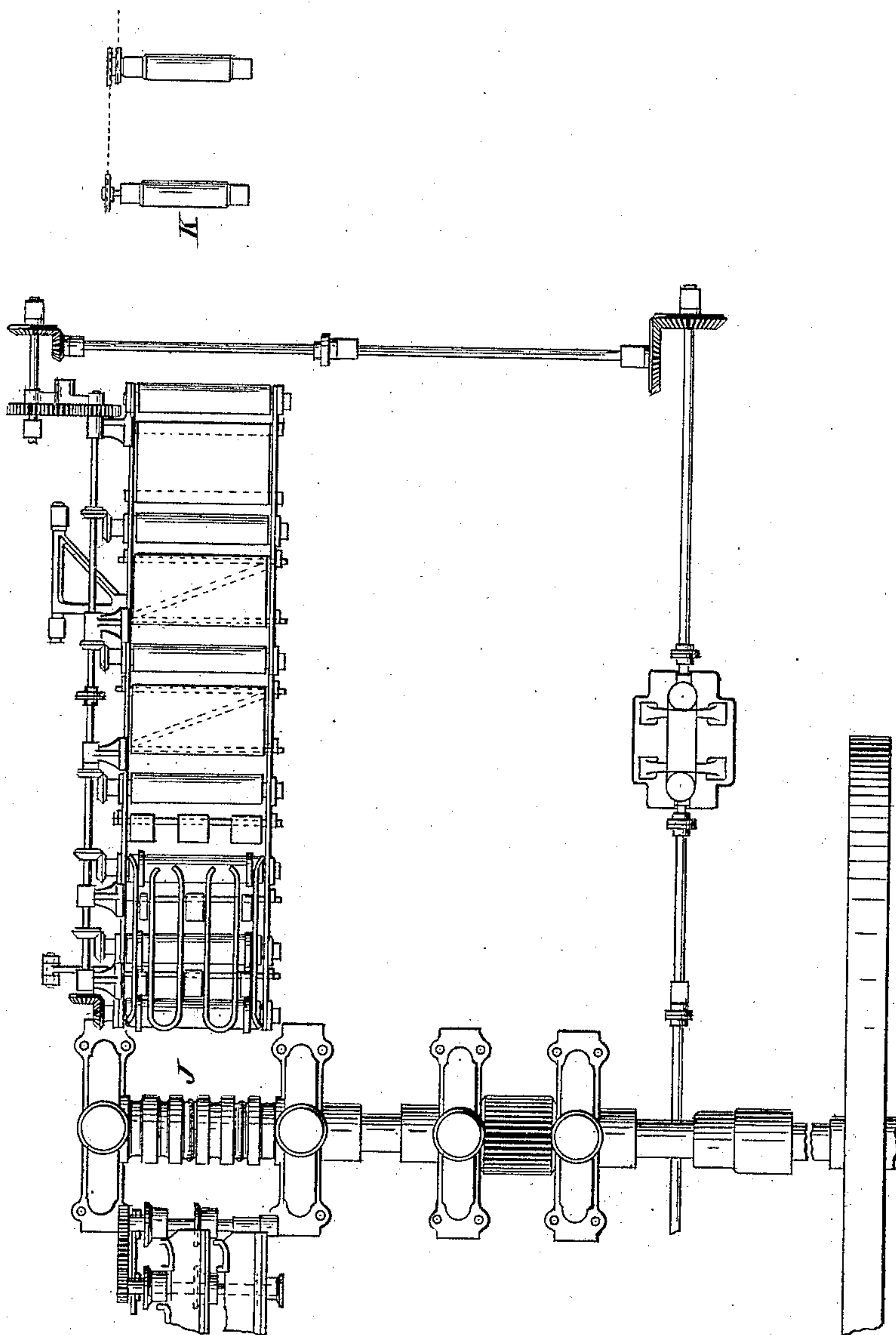
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Fig. 4.



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(No Model.)

5 Sheets—Sheet 5.

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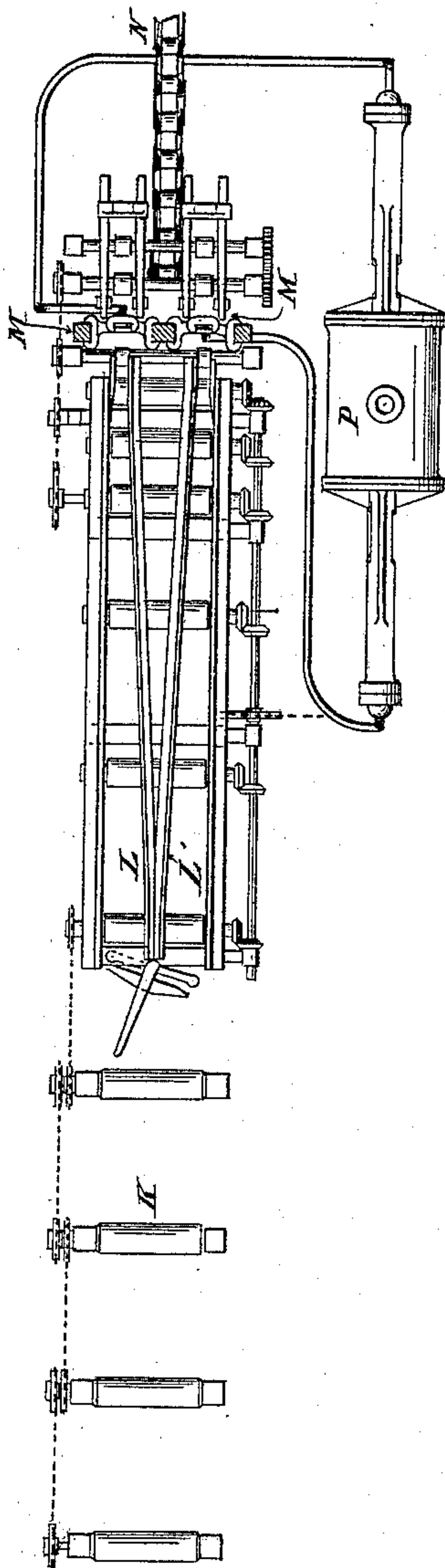


Fig. 5.

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# UNITED STATES PATENT OFFICE.

HORACE S. SMITH AND CHARLES PETTIGREW, OF JOLIET, ASSIGNORS  
TO THE ILLINOIS STEEL COMPANY, OF CHICAGO, ILLINOIS.

## PROCESS OF AND MECHANISM FOR BILLET-FORMING.

SPECIFICATION forming part of Letters Patent No. 416,962, dated December 10, 1889.

Application filed August 17, 1889. Serial No. 321,082. (No model.)

*To all whom it may concern:*

Be it known that we, HORACE S. SMITH and CHARLES PETTIGREW, both of Joliet, Will county, State of Illinois, have invented a new and useful Improvement in the Process of and Mechanism for Billet-Forming, of which the following is a full, true, and exact description, reference being had to the accompanying drawings.

By our improvement we are enabled at one heat, and without the interposition of manual labor, to complete the production of perfect billets from the ingot, continually supplying the ingots to the apparatus and removing the billets without any manual interposition whatever, excepting such as may be required to control the machinery.

Our invention will be readily understood from the accompanying drawings, in which—  
Figure 1 represents a plan view of the apparatus generally, showing the relation of the parts; Fig. 2, a plan view, more in detail, of the blooming-mill; Fig. 3, a plan view of the shears and mechanism for removing the ends of the blooms; Fig. 4, a plan view of the billet-mill; Fig. 5, a plan view of the billet-shears and billet-conveyer; Fig. 6, a view of the ingot, and Fig. 7 a view of the completed billet.

Figs. 2, 3, 4, and 5 follow in succession in the process, and are supposed to be connected together, as shown in the general plan, Fig. 1.

A represents, generally, the blooming-mill with automatic transfer-tables and power-rolls, having passes adapted to produce a bloom having a square section. The ingot is fed through these rollers a sufficient number of times to reduce it to the desired section, and is then carried on on the transfer-table B to be delivered to the automatic shears. The transfer-table B feeds it to the transfer-table C, independently operated through a reversible power D. The forward end of the bloom is liable to be imperfect and to contain cavities, and this is therefore removed by the shears E, operated from suitable power mechanism, the piece of the bloom dropping upon the conveyer F, by which it is removed from the path of the advancing blooms. The bloom is then carried to the transfer-table G,

and thence to the transfer-table H, independently operated, which feeds the billet-mill J, the passes of which are arranged to produce the billets square in section. The billet is passed forward and backward a sufficient number of times to reduce it to the desired section, and is then fed outward upon the transfer-table to the transfer-rollers K, which deliver the billets to either channel L or L' of the billet-shears M M, which cut the billets into the desired lengths and drop them to the billet-conveyer N, whence they are removed to be utilized in the subsequent operations. These shears are alternately operated by the steam or hydraulic motor P.

We do not in this application show the detail of the billet-shears and billet-conveyer, the said shears being shown in an application filed by Charles Pettigrew on the 10th day of May, 1889, Serial No. 310,228, and the said conveyer in an application filed by H. S. Smith on the 21st day of March, 1889, Serial No. 304,124. We do not in this application claim the detail of said billet-shears and billet-conveyer.

The operation of our process can now be readily understood. The heated ingot is passed rapidly through the blooming-mill, thence, without allowing it to cool, to the bloom-shears, where the imperfect end is removed. Thence the metal passes onward to the billet-mill without reheating and automatically, where it is reduced to the proper transverse section, and thence the still hot metal, without reheating, is fed to the billet-shears, where it is cut off in desired lengths, and thence it falls upon the conveyer to be carried away for separate use. This process requires, likewise, a peculiar mechanism in which the transfer-tables must be independently operated; and the said process is new in the accomplishment of these results automatically and at one heat.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The process of forming a short billet from an ingot automatically and at one heat, which consists in reducing the hot ingot to a bloom, in feeding the same mechanically to a shears, removing the imperfect end, feeding

said bloom mechanically to the billet-mill, reducing it to the section of a billet, feeding it to the billet-shears, shearing the proper length of billet, and mechanically removing the billet, all at one heat and without the interposition of manual labor, substantially as described.

2. The combination, in a billet-mill, of a blooming-mill, a transfer-table for feeding the ingot to the mill and the bloom from the mill, an independent reversible transfer-table combined with said second table and feeding the bloom to the bloom-shears, a bloom-shears operating on the bloom so fed on said table, a transfer-table to feed said bloom onward, a reversible transfer-table connected therewith and receiving said bloom

and feeding it to the billet-mill, the billet-mill, a transfer-table for feeding the metal onward to the billet-shears table, a transfer-table for feeding the metal to the billet-shears, the billet-shears for cutting the metal, and a conveyer for carrying away the completed billet, the whole operating mechanically and without the interposition of manual labor, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

HORACE S. SMITH.

CHARLES PETTIGREW.

Witnesses:

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