

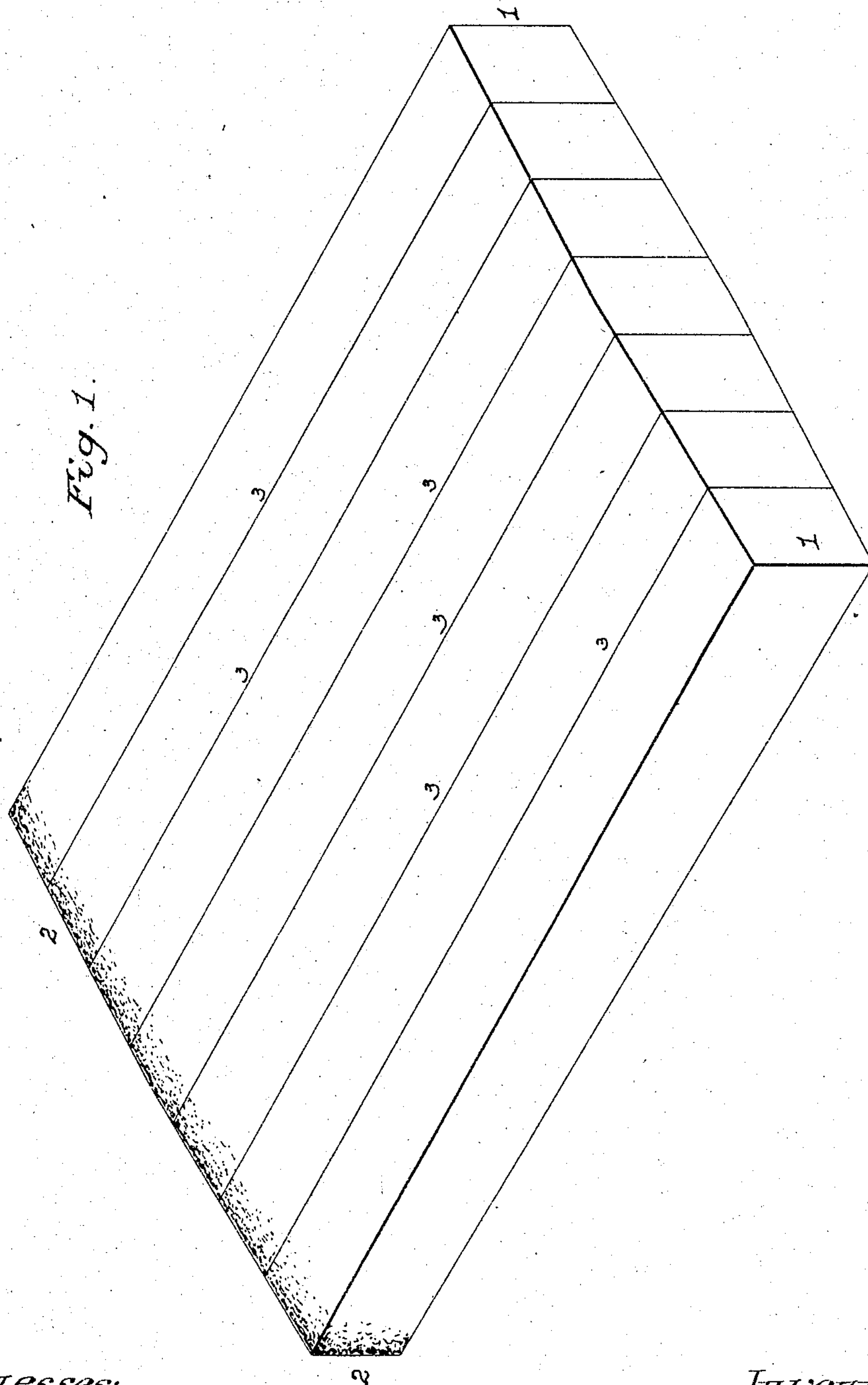
No. 778,195.

PATENTED DEC. 20, 1904.

W. B. HUGHES.
MANUFACTURE OF BILLETS.
APPLICATION FILED MAY 16, 1904.

NO MODEL.

3 SHEETS—SHEET 1.



Witnesses:

Hamilton D. Zinner
Titus N. Irons.

Inventor:
William B. Hughes,
by his Attorneys,
Howson + Howson

No. 778,195.

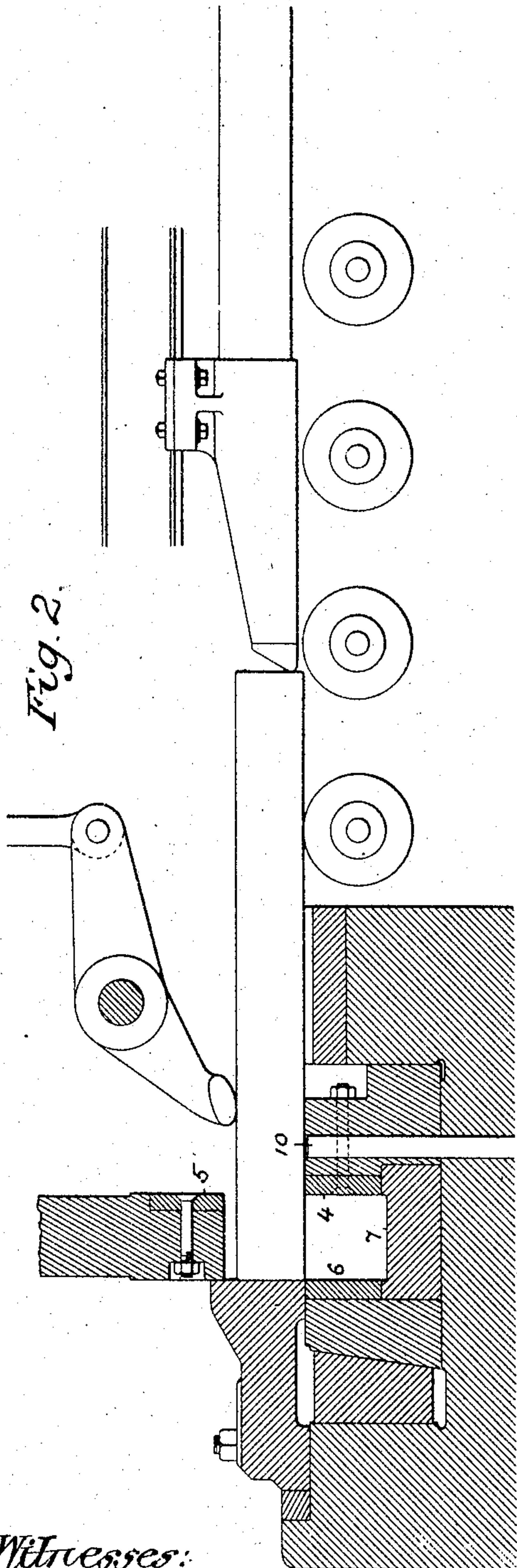
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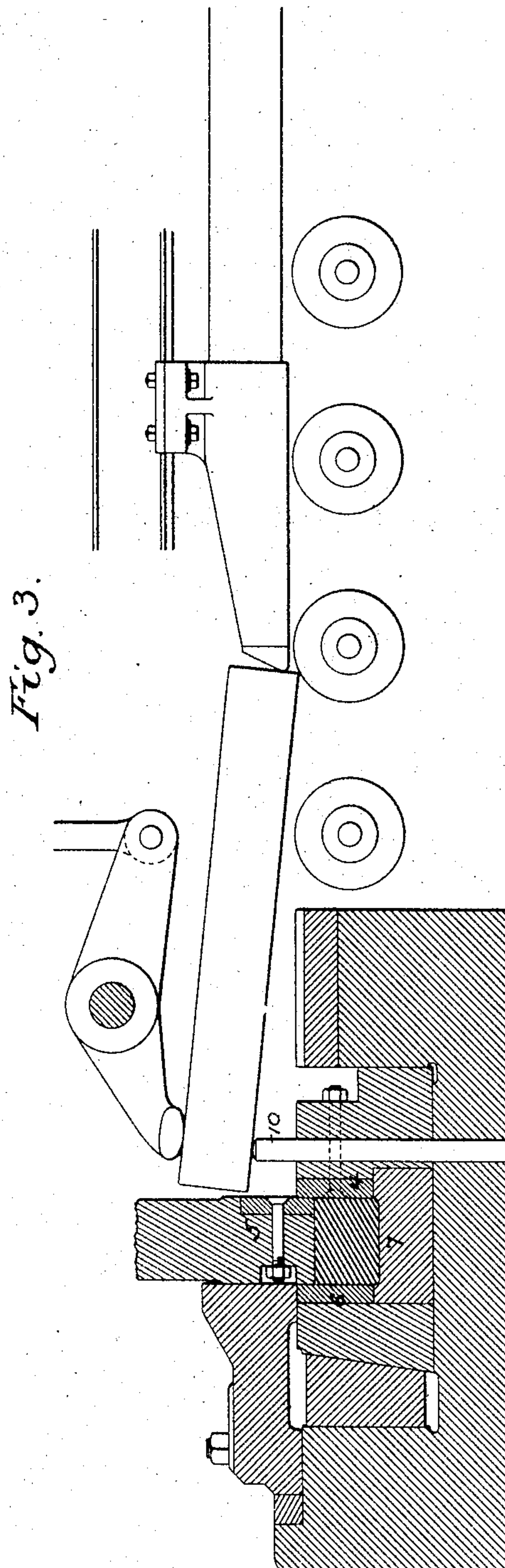
APPLICATION FILED MAY 16, 1904.

NO MODEL.

3 SHEETS—SHEET 2.



Witnesses:
Hamilton S. Turner
Jesse N. Loomis



Inventor:
William B. Hughes,
by his Attorneys
Howson & Howson

No. 778,195.

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NO MODEL.

3 SHEETS—SHEET 3.

Fig. 4

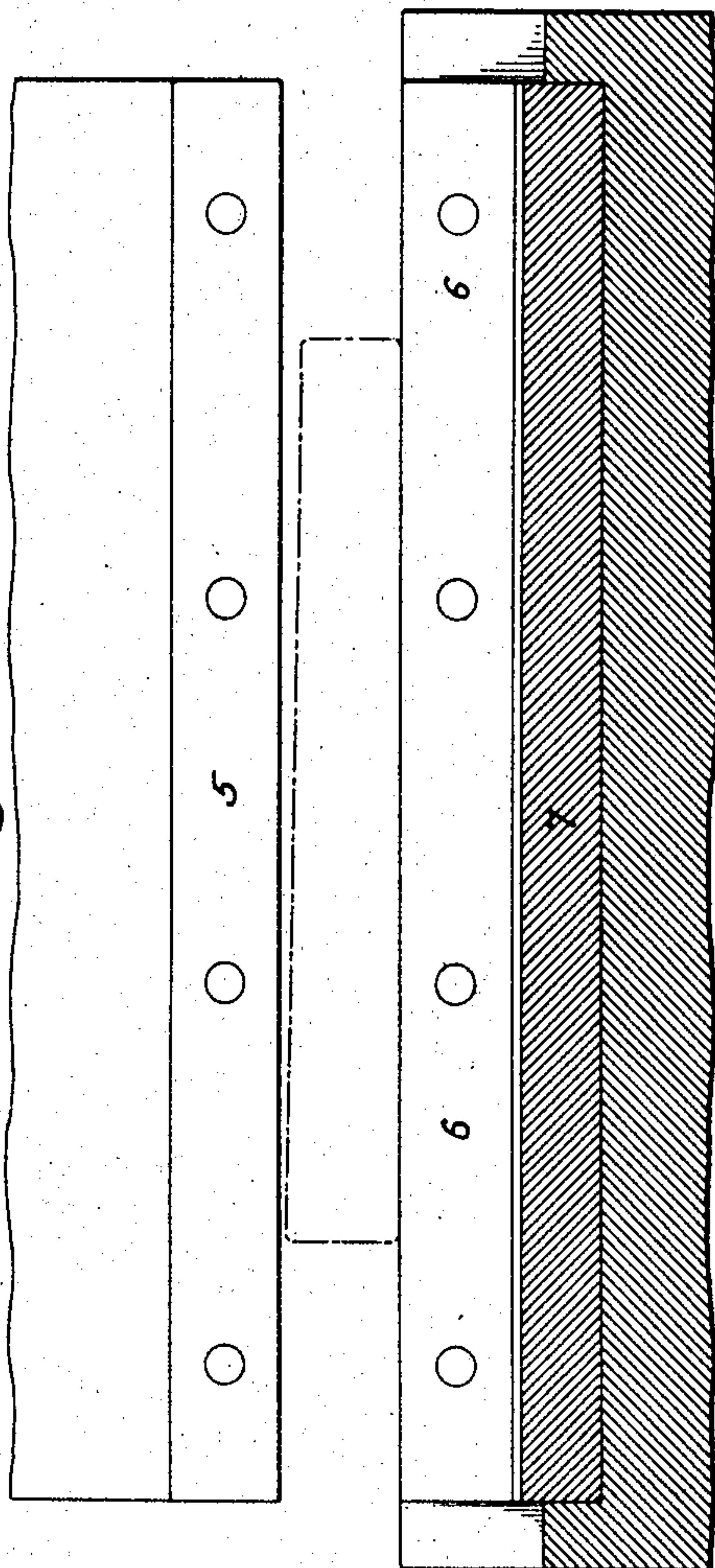
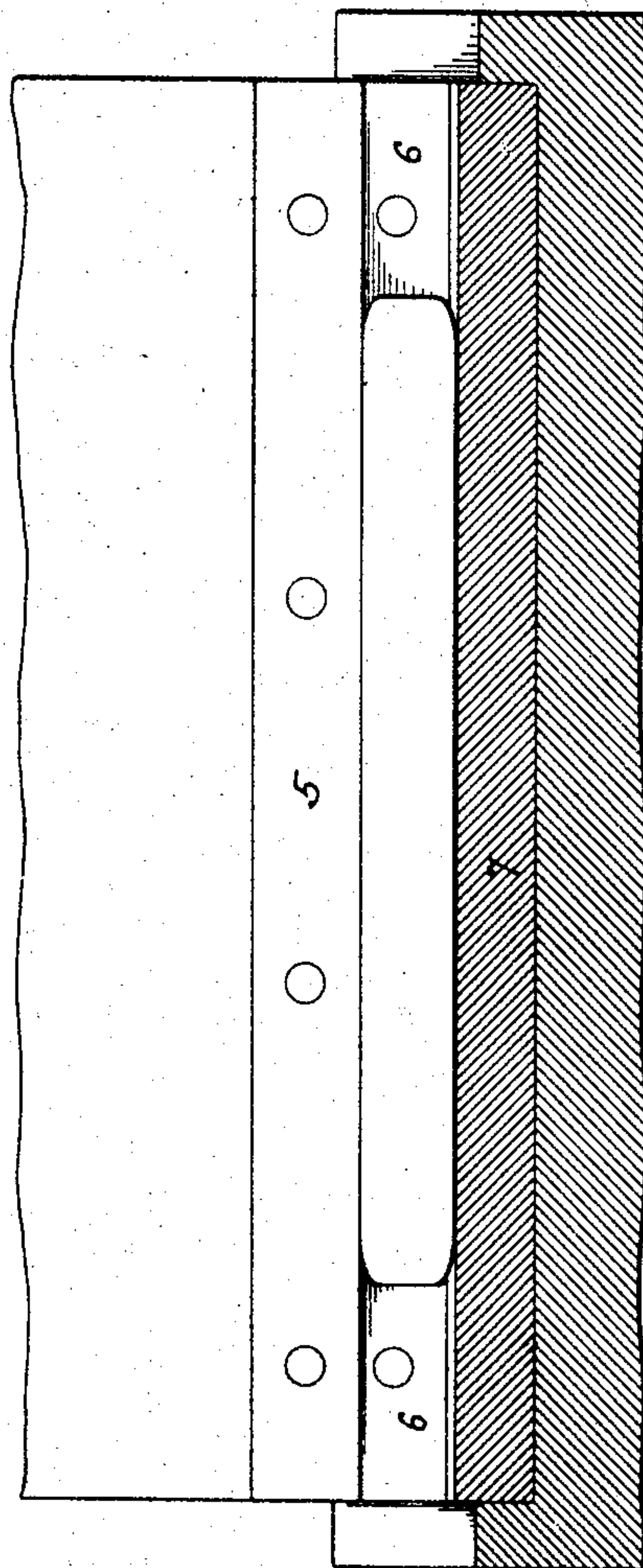


Fig. 5.



Witnesses:

Hamilton S. Turner
Titus H. Jones.

Inventor:
William B. Hughes,
by his Attorneys,
Howson & Howson

UNITED STATES PATENT OFFICE.

WILLIAM B. HUGHES, OF PHILADELPHIA, PENNSYLVANIA.

MANUFACTURE OF BILLETS.

SPECIFICATION forming part of Letters Patent No. 778,195, dated December 20, 1904.

Application filed May 16, 1904. Serial No. 208,240.

To all whom it may concern:

Be it known that I, WILLIAM B. HUGHES, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain
5 Improvements in the Manufacture of Billets, of which the following is a specification.

My invention consists of certain improvements in the manufacture of billets, forming the subject of my Letters Patent No. 672,773,
10 dated April 23, 1901, the object of my present invention being to effect the conversion of the metal into a number of compressed billets without the waste of metal attending the process of manufacture set forth in said patent.
15 This object I attain in the manner hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of an ingot, illustrating the manner in which the same is
20 severed in accordance with my present invention in order to convert it into a number of billets. Figs. 2 and 3 are transverse sections illustrating the successive steps in the manufacture of a billet in accordance with my in-
25 vention, and Figs. 4 and 5 are longitudinal sections with the parts respectively as shown in Figs. 2 and 3.

The invention forming the subject of my above-mentioned patent consisted in shearing
30 from an ingot successive sections, each of a size proportionate to the billet which it was desired to produce, and then compressing these sheared-off sections into billet form between suitable compressing-dies. In carry-
35 ing out the former invention the ingot was severed transversely or from side to side, and as a consequence there was considerable waste of metal at the "crop end" of the ingot—that is to say, the top portion of the same—for in
40 casting the ingot the dirt, cinder, and slag poured into the mold with the steel from the ladle collects at the top of the mold, and in shearing off this crop end, which of course was not available for the formation of a billet, con-
45 siderable good metal was necessarily cut away with the impurities. In carrying out my present invention, therefore, I shear the billet on lines running from top to bottom of the same, so that each section of the billet will

have its corresponding portion of the crop 50 end, which will be compressed with the billet in the dies and will be subjected to the subsequent rolling operations which the billet has to undergo in order to reduce it to a commercial shape. Hence when the crop end is 55 finally sheared from the finished product it will carry with it a much less proportionate amount of metal than if it was sheared directly from the ingot.

Fig. 1 is a representation of an ingot, 1 be- 60 ing the broad or base end of the same, and 2 the crop end or top with the slag, cinder, and other impurities embedded therein. This ingot is severed on lines 3, extending from top to bottom of the ingot, by means of the fixed 65 die 4 and movable die 5, as shown in Figs. 2 and 3, and immediately after the section has been severed from the ingot it is compressed between the dies 4, 5, 6, and 7, as shown in Figs. 3 and 5, the compression being to such 70 an extent that the taper of the section which corresponds with the tapering form of the ingot will be eliminated and the billet subjected to a uniform pressure from end to end, so as to effect uniform compression and solidification 75 of the metal in all parts of the mass, and thus insure a uniform and homogeneous billet. After the compression has been completed the dies are separated and the billet is pushed longitudinally from the dies in the manner set forth 80 in my former patent. It is preferable to remove the ingot from contact with the dies immediately after the section has been severed from the forward end of the ingot in order to prevent excessive heating of the dies, which 85 results when the hot ingot is permitted to remain in contact with the dies during the entire time that the shearing and compressing operation is being performed. For this purpose I may employ lift-rods—such, for in- 90 stance, as shown at 10 in Fig. 3—or the ingot may after the shearing of each slice from the forward end of the same be withdrawn or retracted during the time that the compression of the billet is being effected, the lifting of 95 the ingot from the die being preferred, however, as the quicker and more convenient method of obtaining the desired result. The

ingot may be sheared and compressed immediately after being removed from the mold and while still retaining sufficient of its initial heat to render it plastic, or it may, if desired,
5 be subjected to a special heating after its removal from the mold.

In carrying out my present invention I may, as in the former case, compress each section of the ingot before shearing the same, and the
10 compressing-dies may be independent of the shearing-dies and may be such as to convert the sheared-off section of the ingots into "shapes" instead of simple billets, the term "billet" as used in the claims being intended
15 to cover such shapes as well.

In the method of manufacture set forth in the former patent successive sections cut from the ingot varied in bulk because of the tapering form of the ingot. Hence no two sections
20 were subjected to the same degree of compression, and there was consequently a variation in the density of the billets produced, an objection which is overcome by the present invention.

Having thus described my invention, I claim 25 and desire to secure by Letters Patent—

1. The mode herein described of forming billets, said mode consisting in subjecting to shearing and compressing action successive sections of an ingot, which extend from top 30 to bottom of said ingot, each section retaining its proportionate share of the crop end of the ingot, substantially as specified.

2. The mode herein described of forming billets, said mode consisting in shearing from 35 an ingot successive sections extending from top to bottom of the ingot, and each retaining its respective portion of the crop end, and immediately compressing such section to billet form, substantially as specified. 40

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

WILLIAM B. HUGHES.

Witnesses:

WALTER CHISM,
JOS. H. KLEIN.