

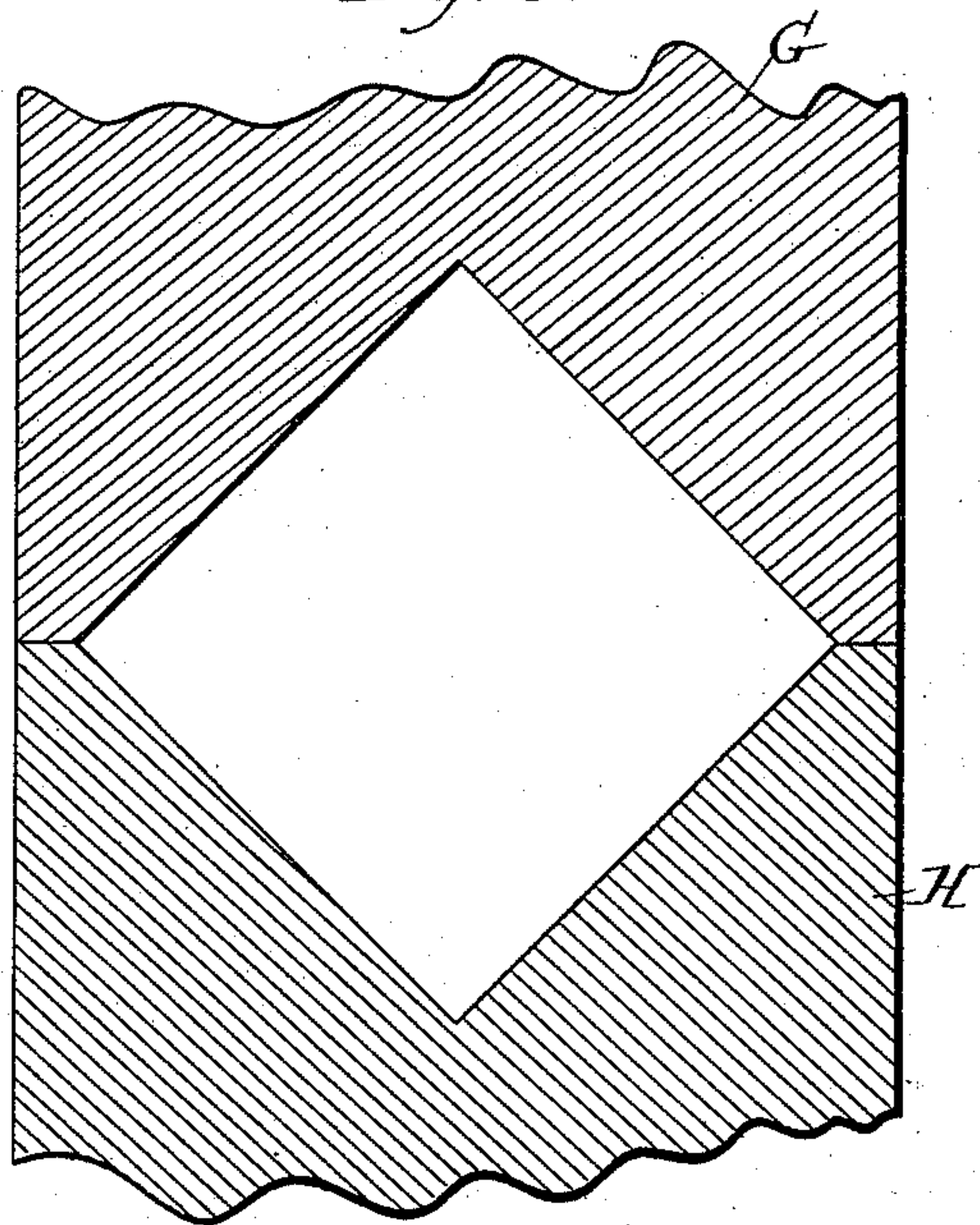
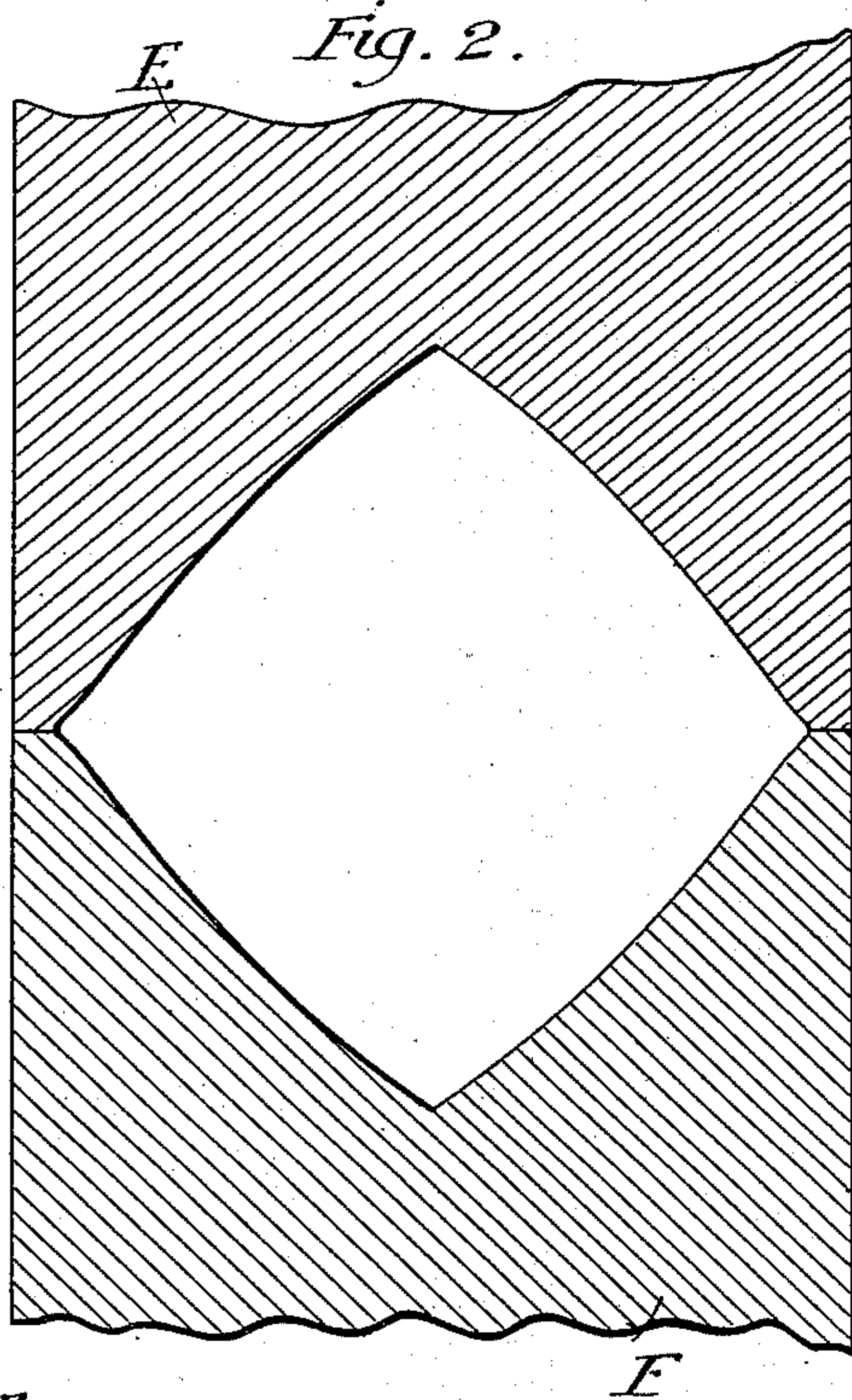
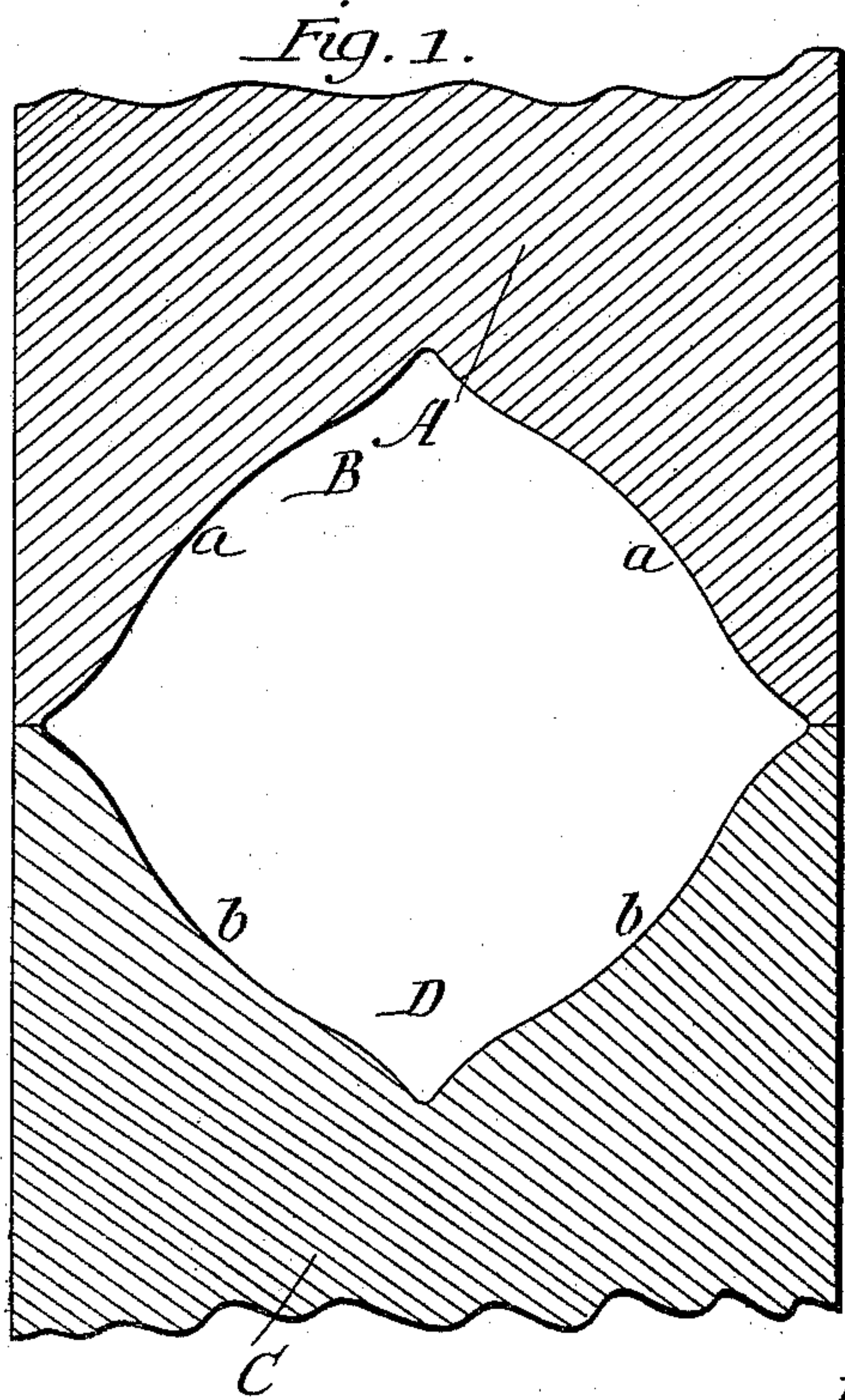
(No Model.)

2 Sheets—Sheet 1.

W. B. SANDFORD.
METHOD OF MAKING SQUARE METAL PIPE.

No. 410,203.

Patented Sept. 3, 1889.



Witnesses:
Albert H. Adams.
Harry J. Jones.

Inventor:
Wm B. Sanford,
By Hest & Bond Attys

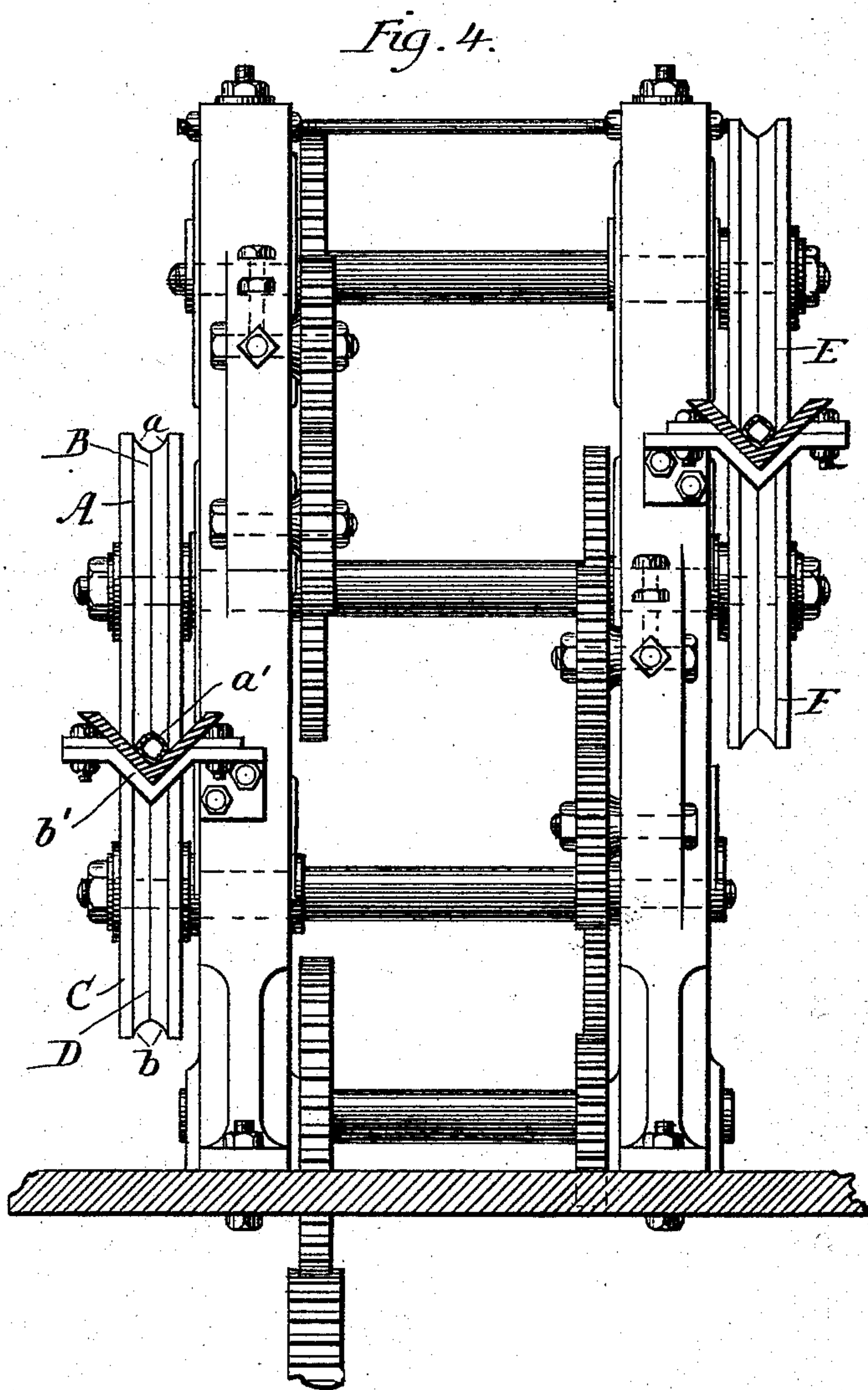
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UNITED STATES PATENT OFFICE.

WILLIAM B. SANDFORD, OF KEWANEE, ILLINOIS, ASSIGNOR TO THE HAXTUN
STEAM HEATER COMPANY, OF SAME PLACE.

METHOD OF MAKING SQUARE METAL PIPE.

SPECIFICATION forming part of Letters Patent No. 410,203, dated September 3, 1889.

Application filed July 23, 1889. Serial No. 318,423. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM B. SANDFORD, residing at Kewanee, in the county of Henry and State of Illinois, and a citizen of the United States, have invented a new and useful Improvement in the Method of Manufacturing Square Metal Pipe from Round Pipe, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical section through a portion of two rolls, taken at their contact-points, showing the form of the grooves in the peripheries of the two rolls. Fig. 2 is a view the same as that shown in Fig. 1, except that the form of the groove is different. In Figs. 1 and 2 the faces and sides of each groove are concave. Fig. 3 is a section like that shown in Fig. 1, the grooves in the faces of the rolls being angular. Fig. 4 represents two pairs of rolls mounted in a single frame.

Letters Patent of the United States No. 368,622 were granted to me August 23, 1887, for improvement in the manufacture of square metal pipe, in which patent I showed and described devices for manufacturing square metal pipe from round pipe without the use of a mandrel or other interior support, the leading feature in such patent being bell-shaped dies, substantially rectangular in cross-section on the inside and having their acting faces more or less concave. According to said patent, square pipe could be made by drawing round pipe through such dies.

The object of my present invention is to provide an improved method of manufacturing square metal pipe from round pipe without the use of a mandrel or other interior support, which I accomplish by passing round pipe through rolls, each roll provided with a groove in its face, the sides of each groove being concave instead of straight. To bring the pipe to its most perfect form, I pass the pipe through finishing-rolls, which are provided with grooves in their faces, the sides of which grooves are straight. I have illustrated in the accompanying drawings machinery and rolls having forms adapted to do this work.

That which I claim as new will be pointed out in the claim.

In the drawings, A represents a roll made of metal, as is usual.

B is a groove in the periphery or face of the roll A. The two sides *a a* are each somewhat concave, as shown in the drawings.

C is another roll similar to the roll A. It is provided with a groove D in its periphery or face, and the sides *b b* of this groove are concave, the same as the sides *a a* of the roll A. These rolls A C are to be of any suitable size, and are to be mounted in a strong frame and may be driven by cog-wheels in the usual manner.

E F are two other rolls similar to rolls A C, except that the sides of the grooves in these two rolls E F are concave less than are the sides of the grooves in the rolls A C. These rolls E F are also to be mounted in a strong frame and may be driven in any suitable manner.

A convenient way to arrange the rolls is to place the two A C upon one side and E F upon the opposite side of the same frame, as shown in Fig. 4.

In manufacturing square pipe from round pipe by the use of these rolls the pipe is to be first suitably heated in a furnace, and each piece is then to be passed first between the rolls A C, the movement of the rolls forcing the pipe through them. After a piece of pipe has been passed through the rolls A C it is to be passed through the rolls E F, the grooves in the faces of which are less concave than those in the rolls A C, and when the pipe leaves the rolls E F it will be nearly, if not quite, square. However, to bring the pipe to its most perfect form, I use finishing-rolls G H, which are provided with grooves in their faces, the sides of which grooves are straight, the grooves being so formed that when the two rolls are together the two grooves form an exact square. The finishing-rolls G H may be mounted in a separate frame and driven in the usual manner. A straightening-die may be used similar to that shown in Fig. 4 of my said former patent, the object of which is not to aid in giving the pipe its square form, but to prevent it from twisting. The pipe may be delivered into a trough after it passes through the straightening-die, as shown in my former patent. In Fig. 4, *a'* rep-

resents a piece of pipe, and *b'* a trough in which the pipe is delivered. The concave form of the faces of the grooves in these rolls A C and E F is very important, and without
5 this form square pipe could not be made from round pipe by the use of the rolls, because if the faces of the grooves were straight the metal in the pipe would buckle inward while passing between the rolls, and it would
10 then be impracticable to bring the interior of the pipe to a substantially square form.

I am able to manufacture square pipe from round pipe without the use of a mandrel or other interior support, by means of rolls having
15 ing grooves the faces of which are concave, much more rapidly than by the use of the dies described in my former patent. The pipe can be forced between the rolls by their movement, and can be passed between two
20 or three sets of rolls without being reheated, while when the dies are used the pipe should

be reheated after having been drawn through one die before being drawn through another.

In Figs. 1, 2, and 3 the rolls are full size for the manufacture of pipe two inches square. 25

In Fig. 4 I have not shown straightening-dies; but they may be supported in any suitable manner, and should be located so as to receive the pipe as it passes from the rolls, substantially as shown in my former patent. 30

What I claim as new, and desire to secure by Letters Patent, is as follows:

The mode of making square tubes from round tubes, which consists in passing a round tube, unsupported internally, through rolls, 35 which, by their impact upon said round tube, will gradually mold the tube into a square form, substantially as described.

WILLIAM B. SANDFORD.

Witnesses:

JOHN H. PIERCE,

ROBT. BUNCE.