

No. 746,059.

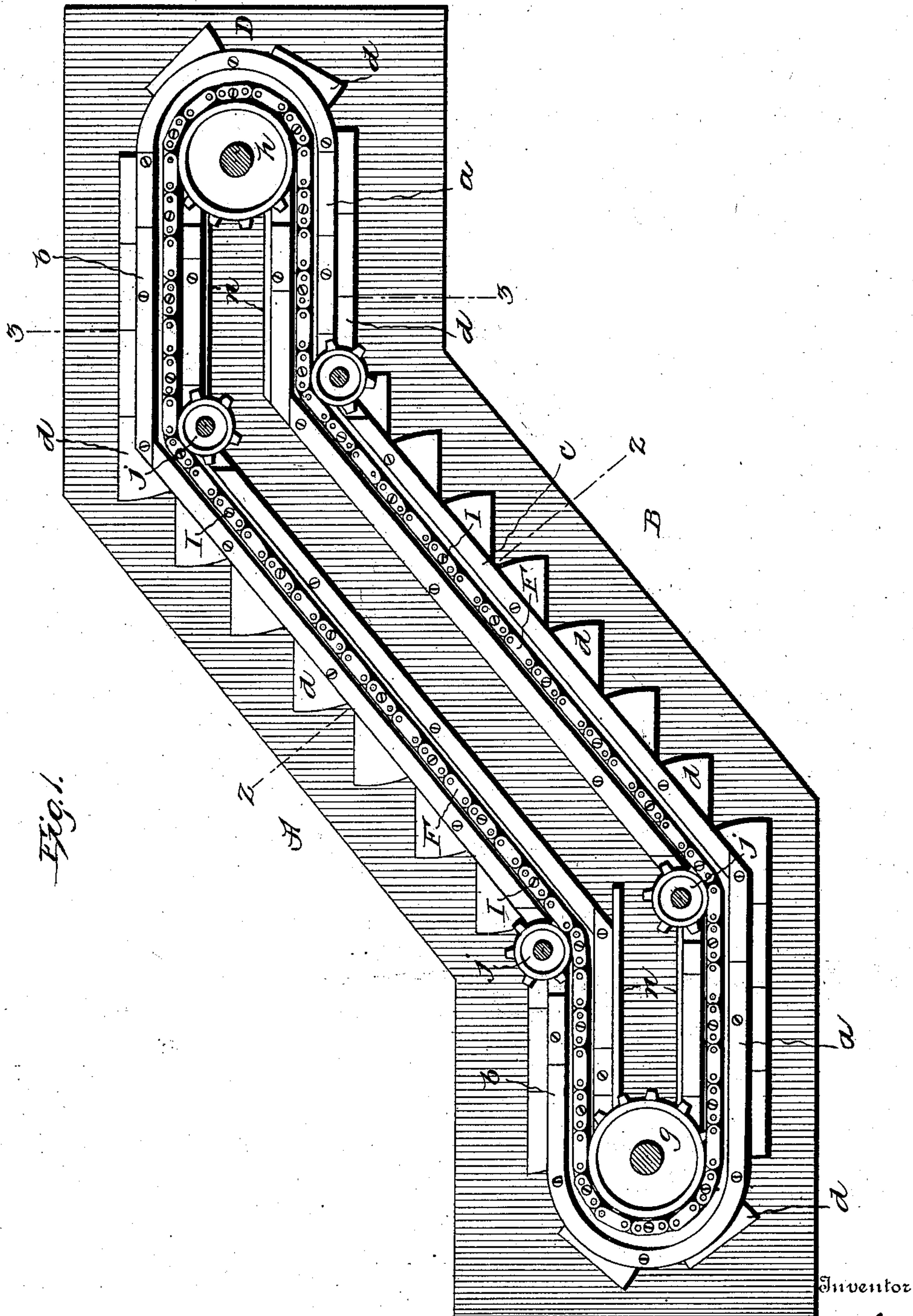
PATENTED DEC. 8, 1903.

E. M. FRASER.  
TRAVELING STAIRWAY.

APPLICATION FILED JAN. 29, 1903.

NO MODEL.

4 SHEETS—SHEET 1.



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Witnesses

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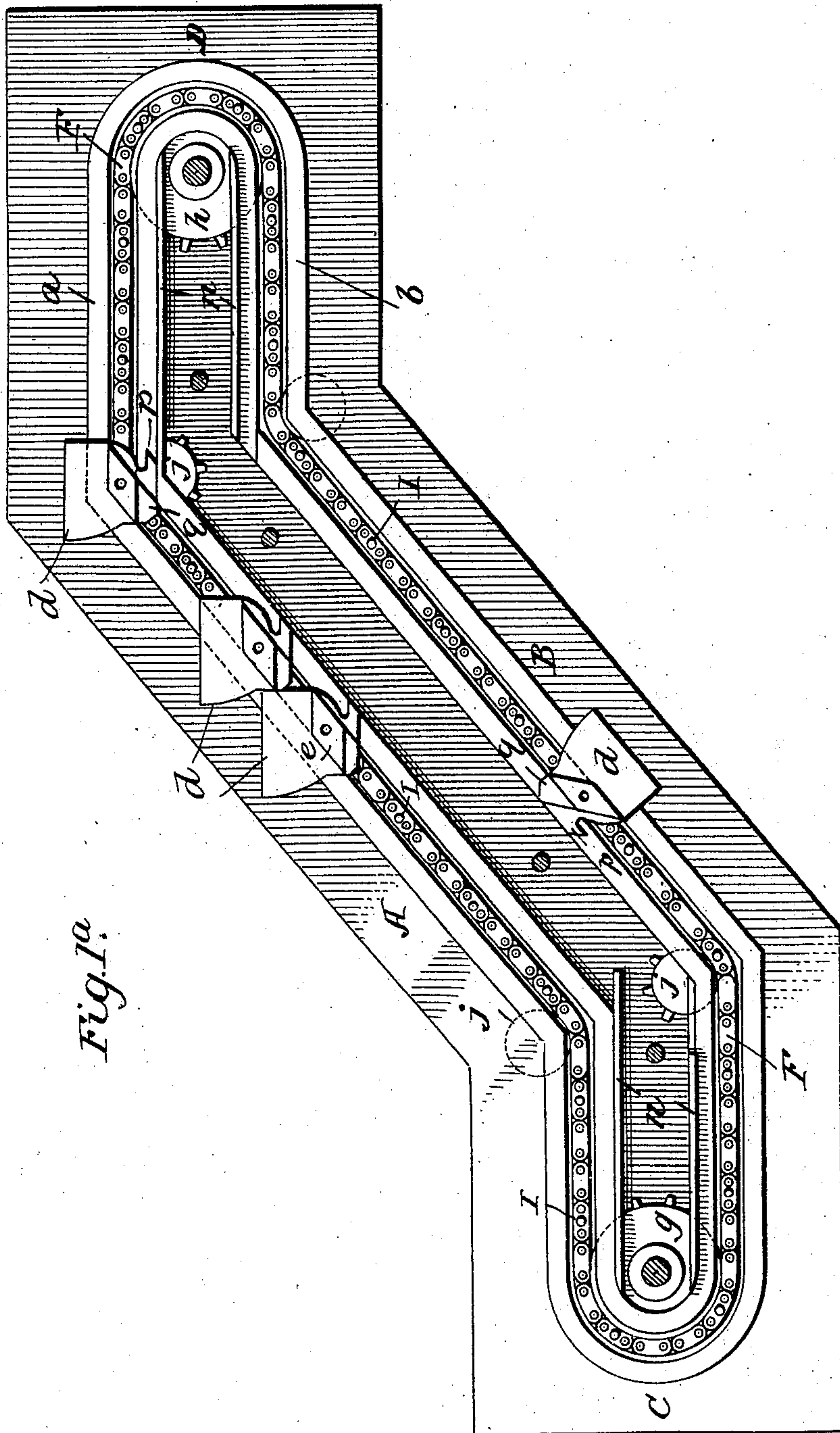


Fig. 1a.

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4 SHEETS—SHEET 3.

Fig. 3.

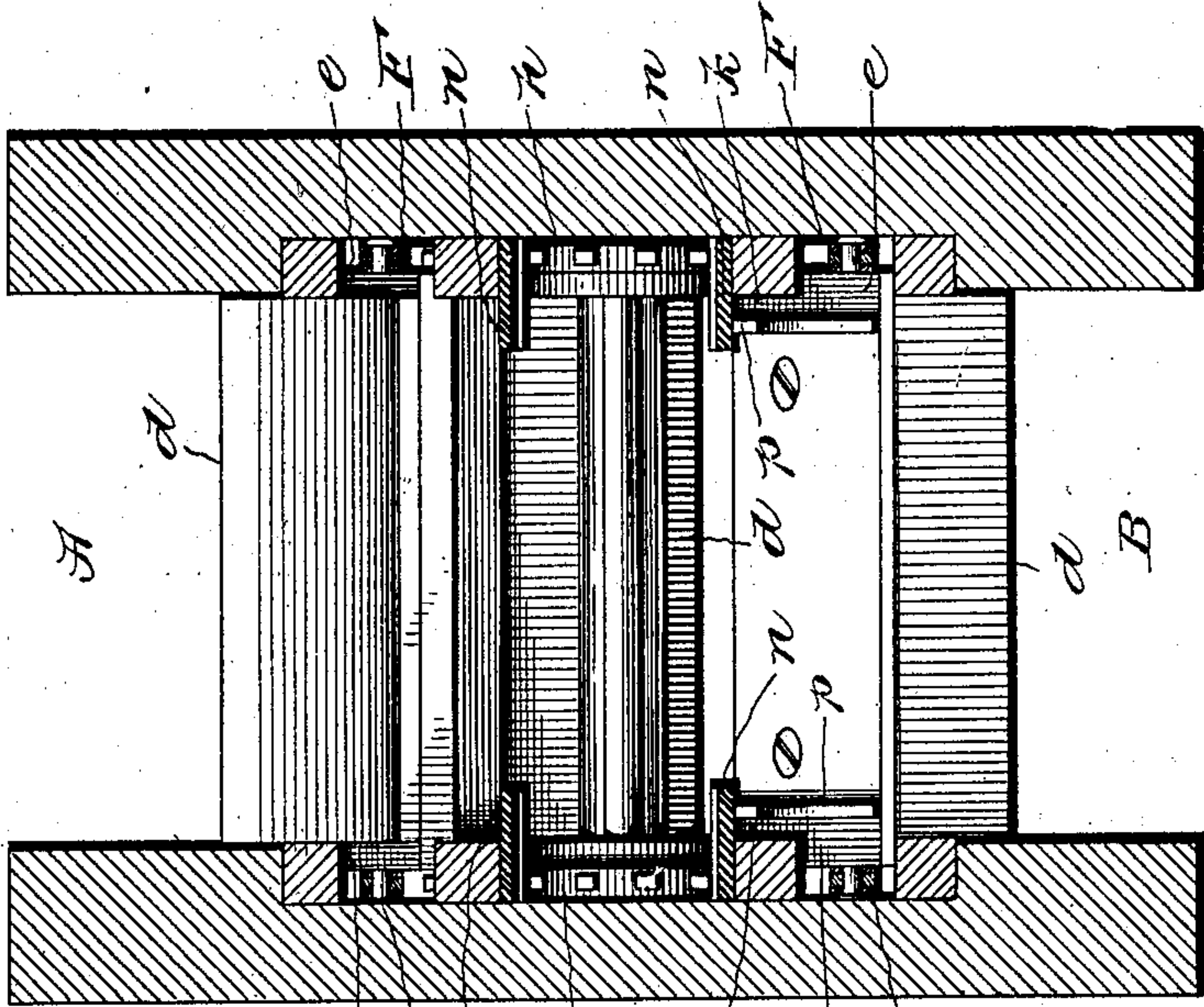
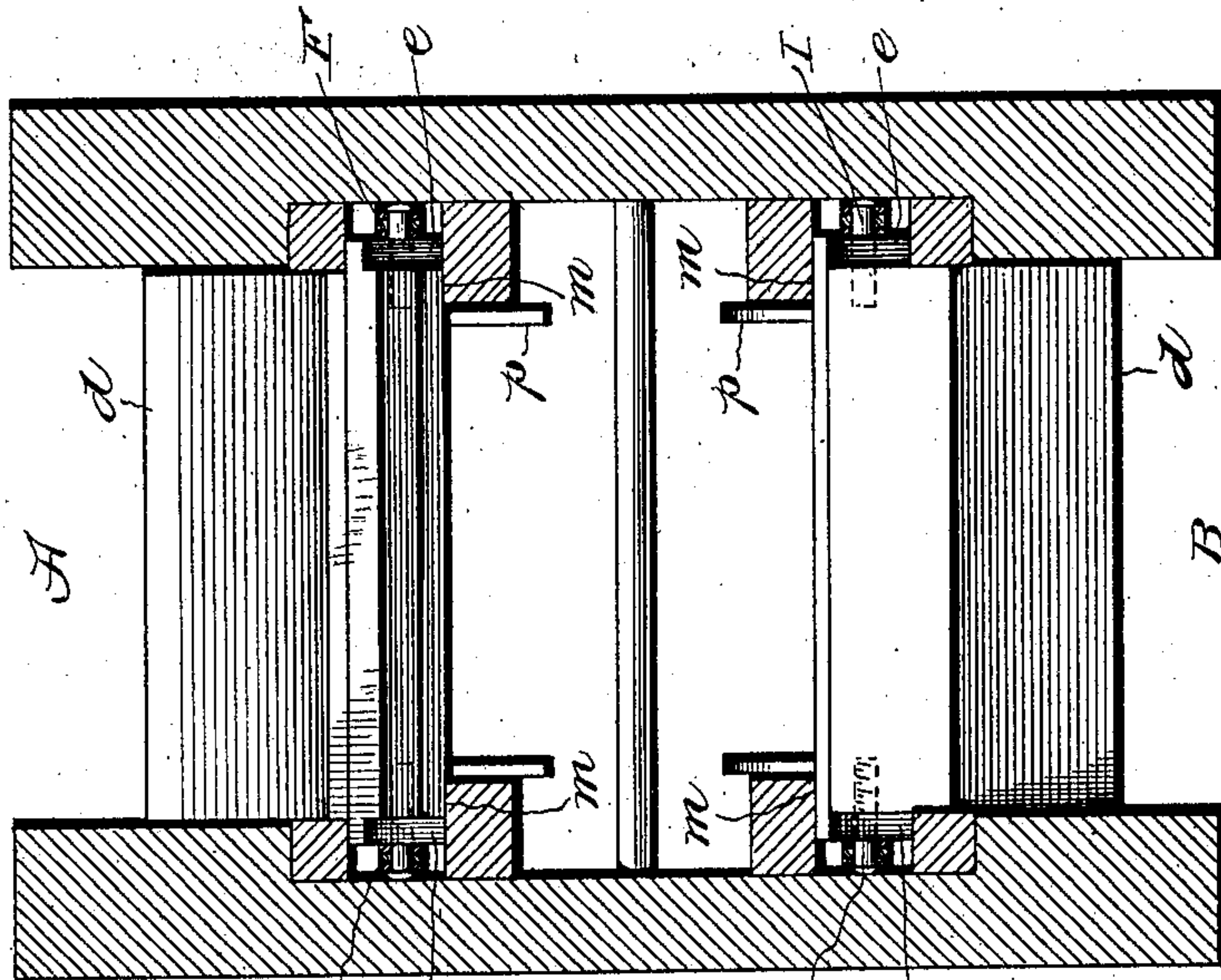


Fig. 2.



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4 SHEETS—SHEET 4.

Fig. 4.

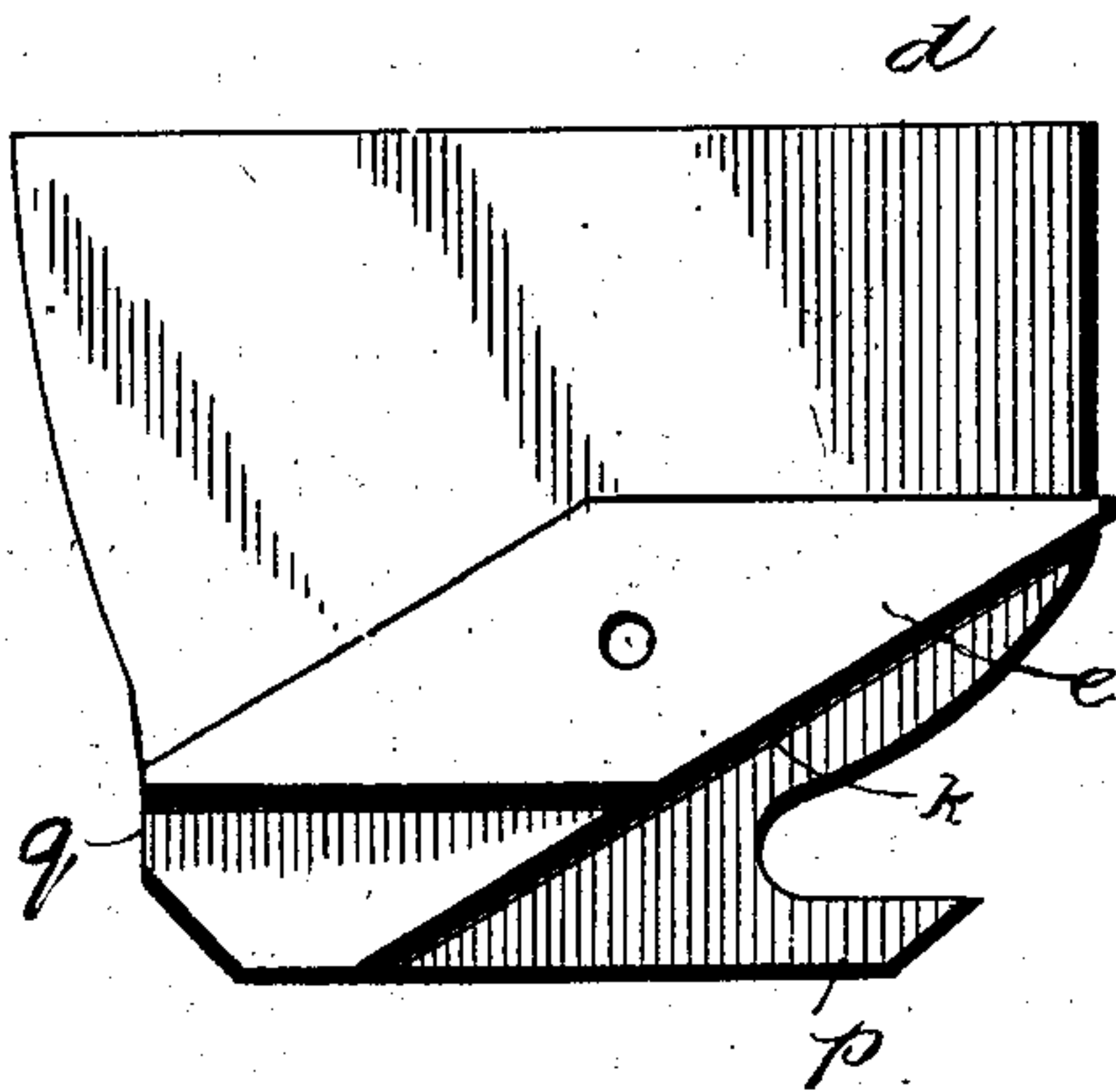


Fig. 5.

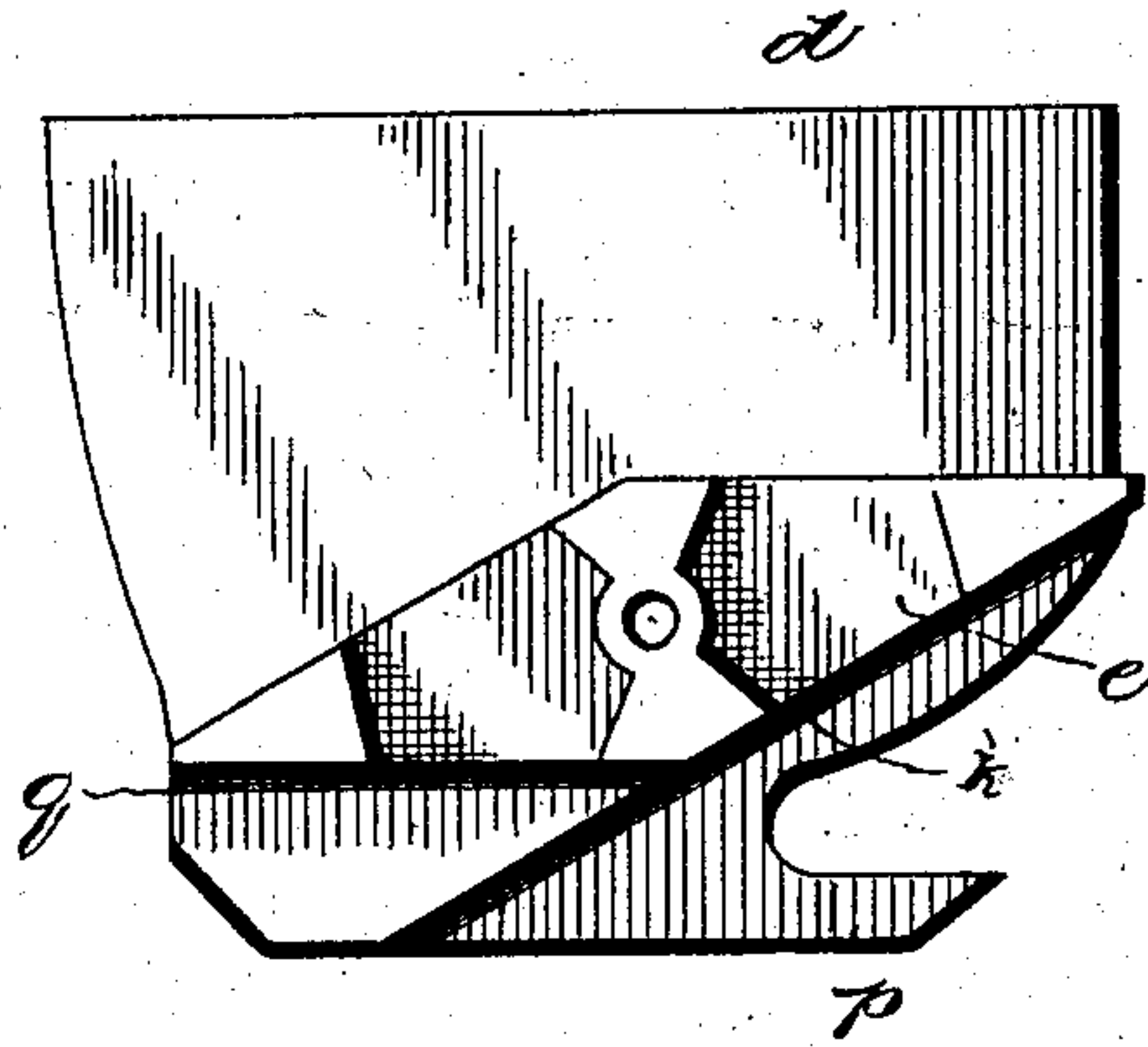


Fig. 6.

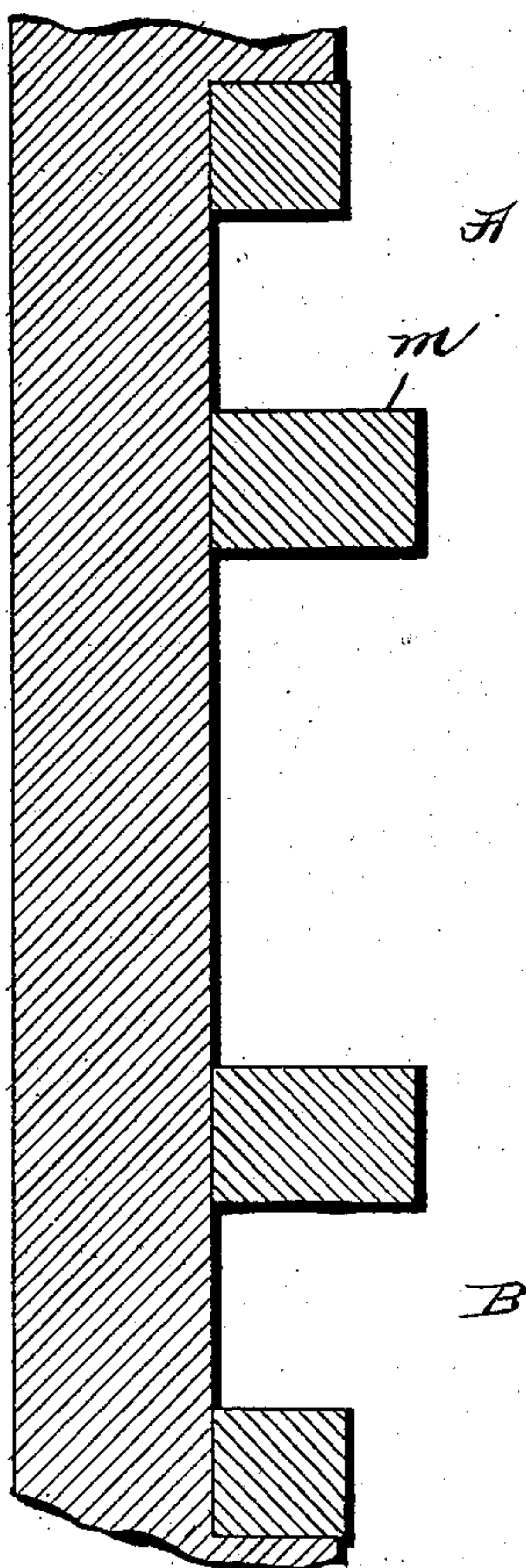
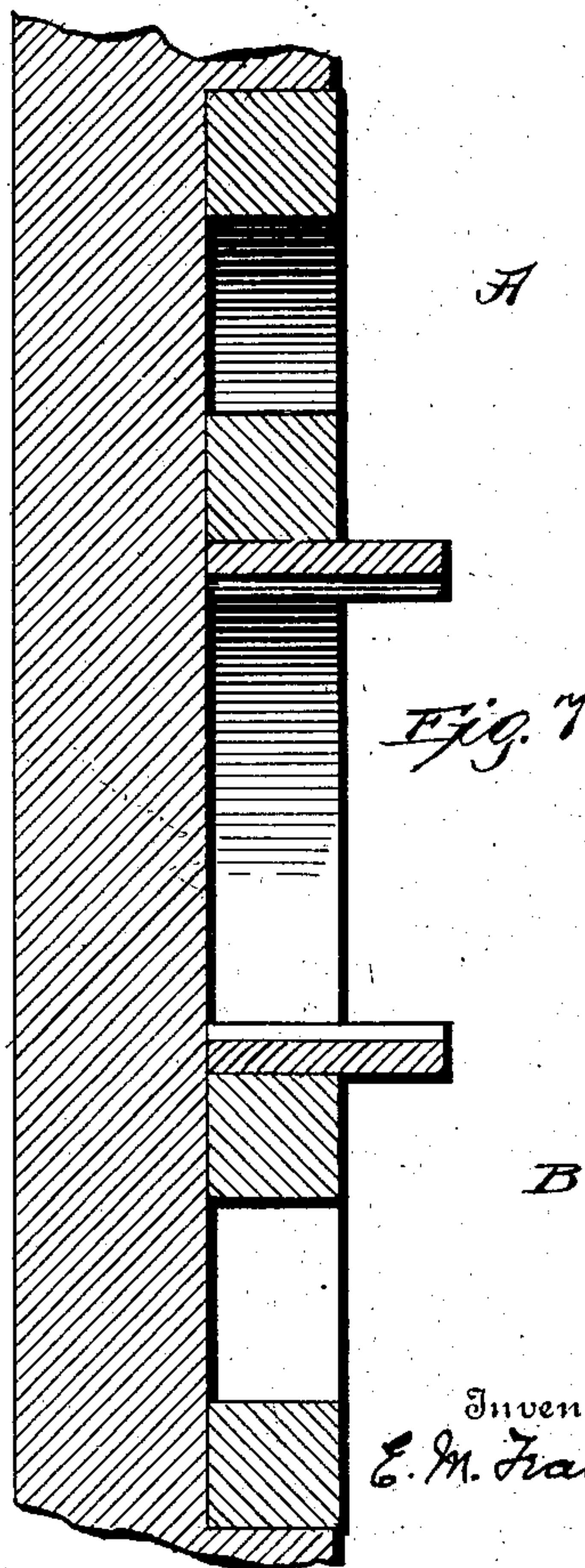


Fig. 7.



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# UNITED STATES PATENT OFFICE.

ETHELBERT M. FRASER, OF YONKERS, NEW YORK, ASSIGNOR TO OTIS ELEVATOR COMPANY, OF EAST ORANGE, NEW JERSEY, A CORPORATION OF NEW JERSEY.

## TRAVELING STAIRWAY.

SPECIFICATION forming part of Letters Patent No. 746,059, dated December 8, 1903.

Application filed January 29, 1903. Serial No. 141,037. (No model.)

*To all whom it may concern:*

Be it known that I, ETHELBERT M. FRASER, a citizen of Canada, residing at Yonkers, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Traveling Stairways, of which the following is a specification.

My invention relates to traveling stairways; and my invention consists in so constructing the side tracks and the step-bearings adapted thereto as to secure a transfer of the bearings from one section of the track to the other without changing position of the bearing except in its traveling direction and in certain features of construction fully set forth hereinafter and illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal sectional elevation of sufficient of a traveling stairway to illustrate my improvement. Fig. 1<sup>a</sup> is a track elevation showing some of the steps. Fig. 2 is a section on the line 2 2, Fig. 1. Fig. 3 is a section on the line 3 3, Fig. 1. Fig. 4 is an enlarged end view of one of the steps; Fig. 5, a view illustrating one mode in which the end step-bearing may be constructed. Fig. 6 is a large sectional view of the track at the inclined portion; Fig. 7, a similar view of the track at the horizontal portion.

There is a chain of steps which travels between two track-sections each of which has horizontal and inclined portions and forwarding and return sections, which preferably are parallel to each other, although, as in some classes of traveling stairways, the return sections may be of a different character or in some instances dispensed with, the chain of steps hanging as a loop between the terminals. Each side track is constructed so as to constitute a guide-channel, which may be formed in any suitable way so as to afford parallel upper and lower bearing rails or faces and either connected in one piece as a grooved channel-iron or suitably built up in any manner which may be found convenient.

As shown in the drawings, the forward and return sections A B are parallel and are connected by curved terminals C D, and each section has a lower horizontal part *a* and an upper horizontal part *b* and intermediate inclined part *c*.

At each end of each step *d* is a bearing *e* of such character that it will fit between the upper and lower bearing-faces of the channel or track, whether at the horizontal or inclined parts thereof. As shown, each bearing *e* is a block of rhombus shape, and it will be seen that when this block is in the horizontal part of the channel its width between the horizontal faces will fill the channel and that when the block is in the inclined portion of the channel its width between its inclined faces will fill the channel. As a result of this construction the passage of the bearing-block from the horizontal to the inclined part of the track or from the inclined to the horizontal portion will be effected by the simple onward movement and change in onward direction without any change in the horizontal position of the block itself, so that the step connected thereto will pass with a continuous motion and without jar from the horizontal to the inclined part or from the inclined to the horizontal part, and there will be no lost motion, as in all of its changing positions the block will fit closely within the channel.

While I have referred to the bearing *e* as in the form of a block, it will be evident that parts might be cut away to secure lightness, as illustrated in Fig. 5, while still maintaining substantially the same outline, and I therefore by the term "block" do not limit myself to a bearing in one continuous unbroken piece.

The steps are suitably connected together to form a continuous chain and preferably by means of two continuous chains F F, each connected to each block at one end by a pin I at a single point, permitting the rocking of the step and while the bearings *e* fit the channel closely at the horizontal and inclined parts the terminal curved portions C D are so formed as to afford the wider space necessary to permit the bearings to turn slightly in passing along the same, there being no nice fit at these portions, but only that arrangement which will serve to guide the steps in their change of direction. The chains F F pass around driving sprockets or wheels *g h*, preferably concentric with the curved terminal portions, and guide-pulleys *j* are arranged at those points where the direction of the chain is changed.



To avoid the friction that would result from depending upon the bearings *e* to prevent the rocking of the steps, I provide upon each step near each end an inclined bearing-face *k* and I extend the lower track-face inward to form at the inclined portion of the track a supplemental bearing-rail *m*, upon which the inclined faces *k* can rest as the chain of steps moves upward. As the bearing-face *k* is inclined, it would not prevent the tilting of the step when the latter is on the horizontal portion of the track, and I therefore provide adjacent to this portion a horizontal bearing-rail *n*, adapted to receive the runner *p*, projecting downward from the bottom of the step and having a lower horizontal face, which when bearing on the rail *n* serves to prevent the tilting of the step.

The steps may be of any desired cross-sectional shape, but, as shown, each has near the bottom of its rise a vertical face *q*, against which the inner edge of the tread of the next step will make suitable close contact, the rise of each step above the face *q* being projected over the next lower step, as shown.

Without limiting myself to the precise construction and arrangement shown, I claim—

1. The combination of the chain or connected series of steps of a traveling stairway, guide-channels partly horizontal and partly inclined, and blocks at the ends of the steps adapted to fit both the inclined and horizontal parts of the channels, substantially as set forth.

2. The combination of the chain or connected series of steps, of a traveling stairway, guide-channels partly horizontal and partly inclined, blocks at the ends of the steps adapted to fit both the inclined and horizontal parts of the channels, and means for imparting a traveling motion to the chain of steps, substantially as set forth.

3. The combination of the chain or connected series of steps of a traveling stairway, guide-channels partly horizontal and partly inclined, blocks at the ends of the steps adapted to fit both the inclined and horizontal parts of the channels, runners carried by the steps, and rail-sections adjacent to the horizontal parts of the channels to afford bearings for said runners, substantially as set forth.

4. The combination in a traveling stairway, of channels partly inclined and partly horizontal, a chain of steps having blocks adapted to said channels, rails adjacent to the inclined parts of the channels, and inclined bearings near the ends of the steps adapted to said rails, substantially as set forth.

5. The combination in a traveling stairway, of channels partly inclined and partly horizontal, a chain of steps having blocks adapted to said channels, rails adjacent to the inclined parts of the channels, inclined bearings near the ends of the steps adapted to said rails, runners carried by the steps, and rail-sections

adjacent to the horizontal parts of the channels affording bearings for said runners, substantially as set forth.

6. The combination in a traveling stairway, of a series of steps, a guide-channel in parts horizontal, in parts inclined, and curved at the terminals, and rhomboidal blocks at the ends of the steps each of a thickness between its horizontal faces to fit the horizontal parts of the channel and between its inclined faces to fit the inclined parts of the channel, substantially as set forth.

7. The combination in a traveling stairway, of a series of steps, channels, blocks on the steps adapted to said channels, and flexible connections between the steps at the ends thereof, substantially as set forth.

8. The combination in a traveling stairway, of a series of steps, channels, blocks on the steps adapted to said channels, and endless chains extending opposite the ends of the steps and connected to each thereof, substantially as set forth.

9. The combination in a traveling stairway, of a series of steps, channels, blocks on the steps adapted to said channels, and endless chains extending opposite the ends of the steps and connected at one point to each thereof, substantially as set forth.

10. The combination in a traveling stairway, of a series of steps, guide-channels therefor, with bearings arranged to preserve the steps horizontal at all the rising part of the structure, and endless chains extending along the ends of the steps and connected at one point to each of the latter, substantially as set forth.

11. The combination in a traveling stairway, of side guide-channels having horizontal and inclined sections, and a chain of steps each with an end bearing adapted to fit each section of the channel and to pass from one to the other without change from its horizontal position, substantially as set forth.

12. The combination with the forward and return and terminal track-sections of a traveling stairway, of a series of connected steps each with an end bearing fitting both the horizontal and inclined parts of said sections, the terminal sections adapted to permit the said bearings to turn therein, substantially as set forth.

13. The combination with the forward and return and terminal track-sections of a traveling stairway, of a series of connected steps each with an end bearing fitting both the horizontal and inclined parts of said sections, and drive-chains connected at one point to the end of each block, and guide and driving pulleys for said chains, substantially as set forth.

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

ETHELBERT M. FRASER.

Witnesses:

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