

A. S. SPAULDING.
FLEXIBLE DOOR.

No. 541,696.

Patented June 25, 1895.

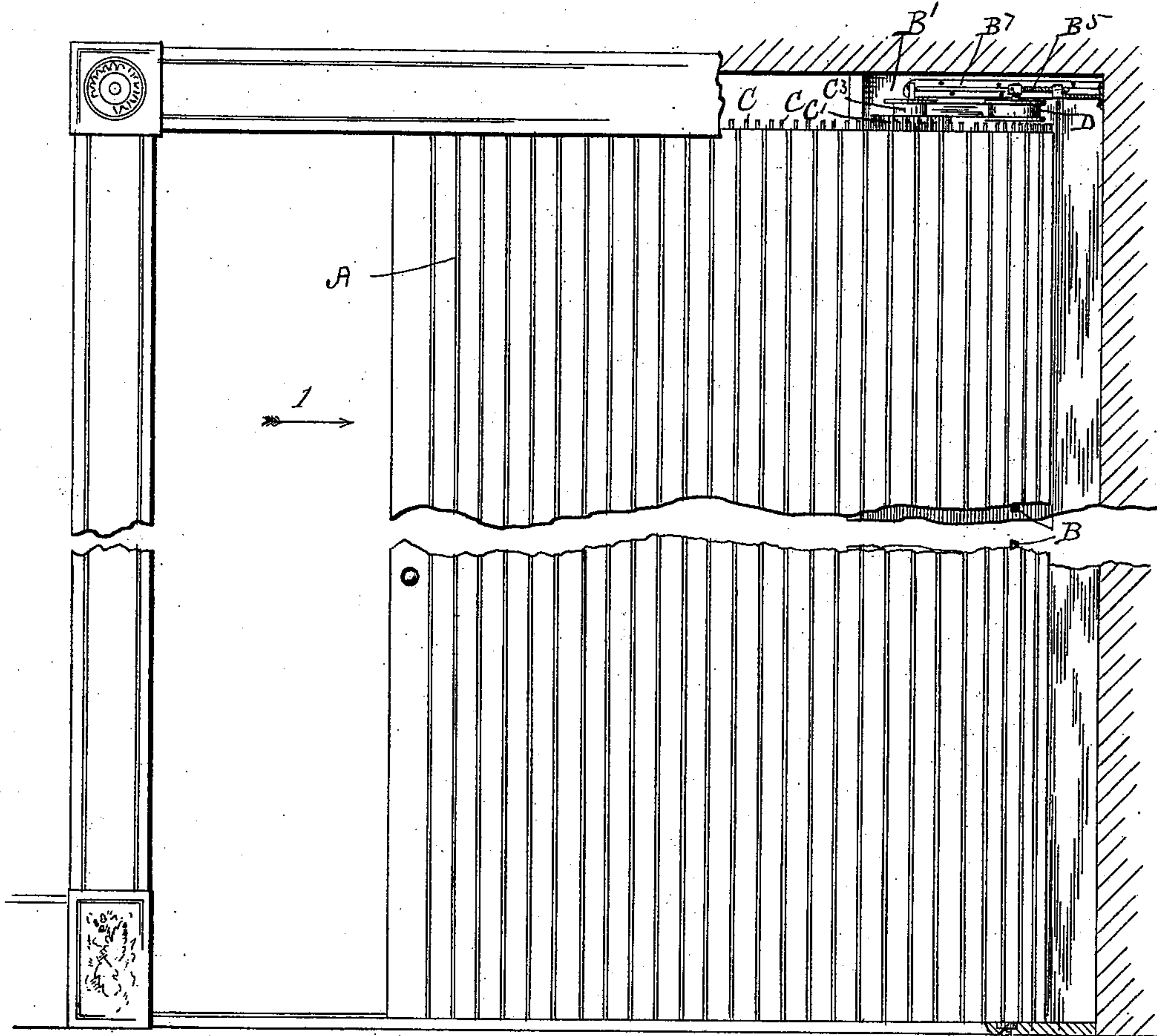


Fig. 1.

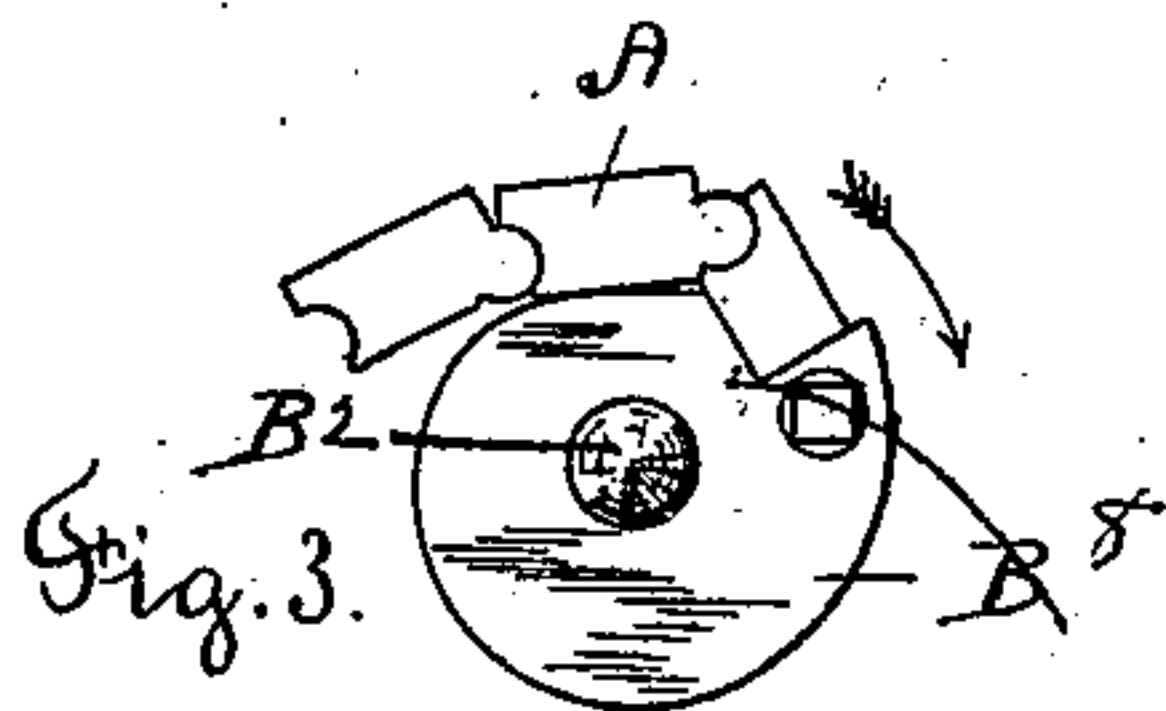


Fig. 3.

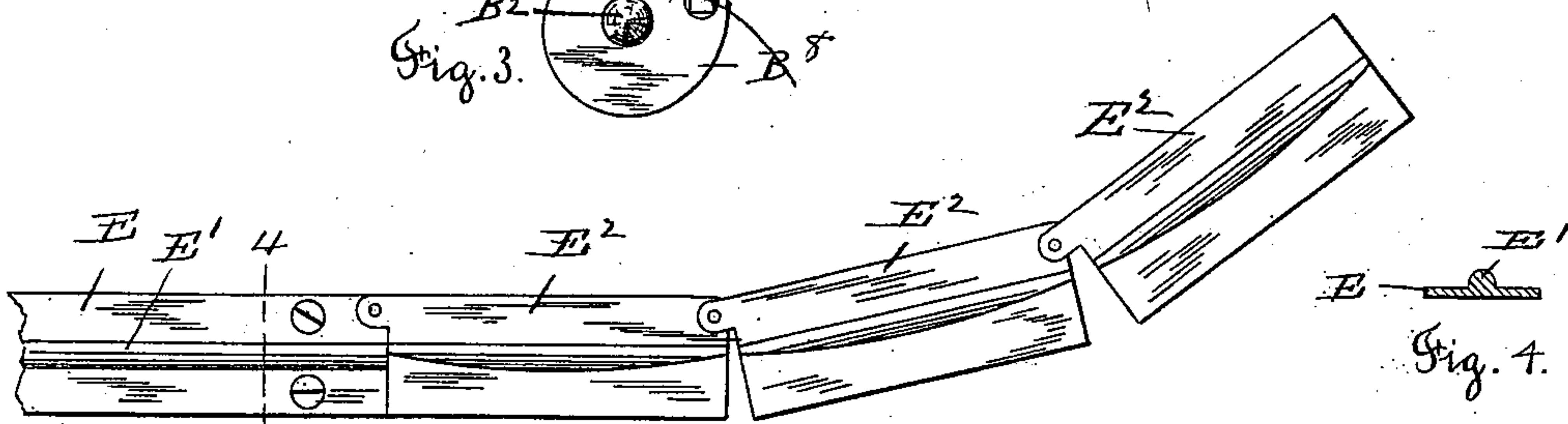


Fig. 2.

Fig. 4.

Witnesses 4
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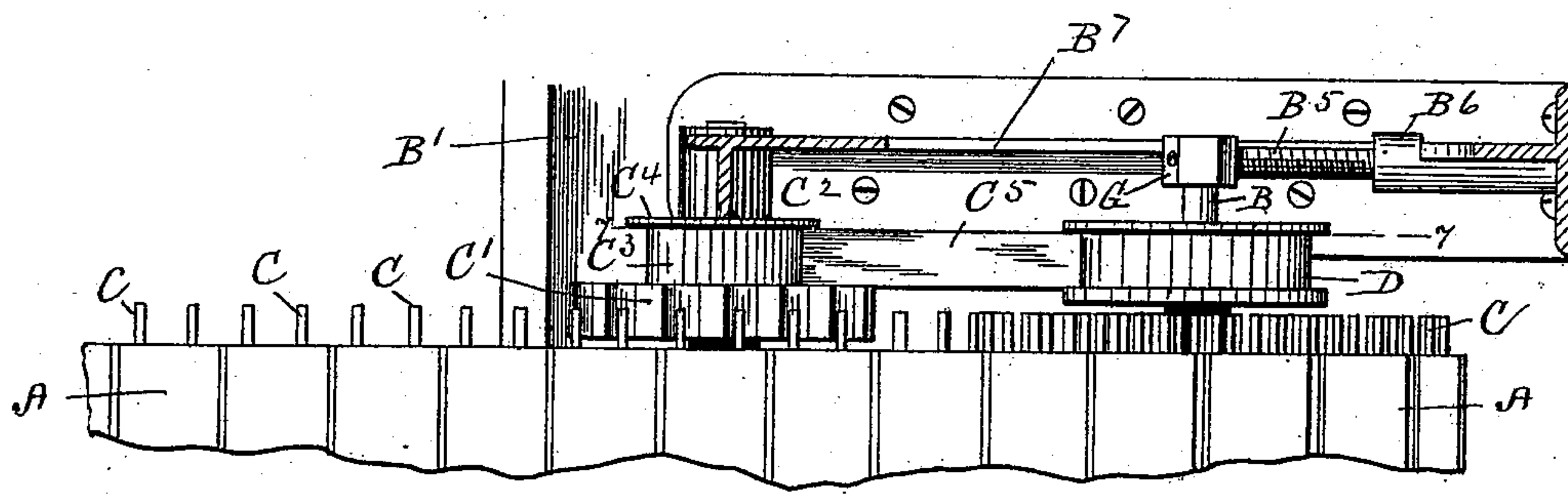
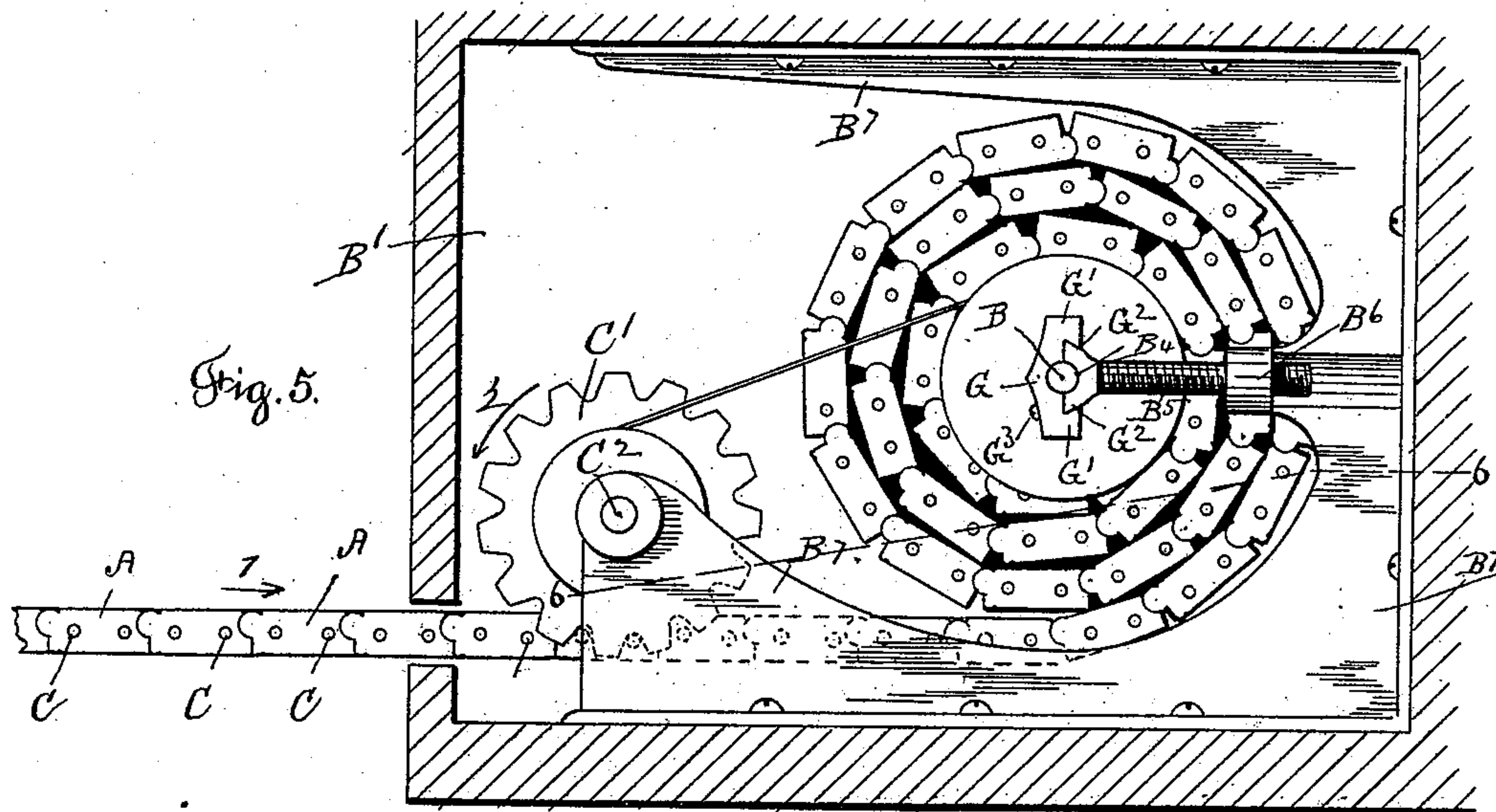


Fig. 6.

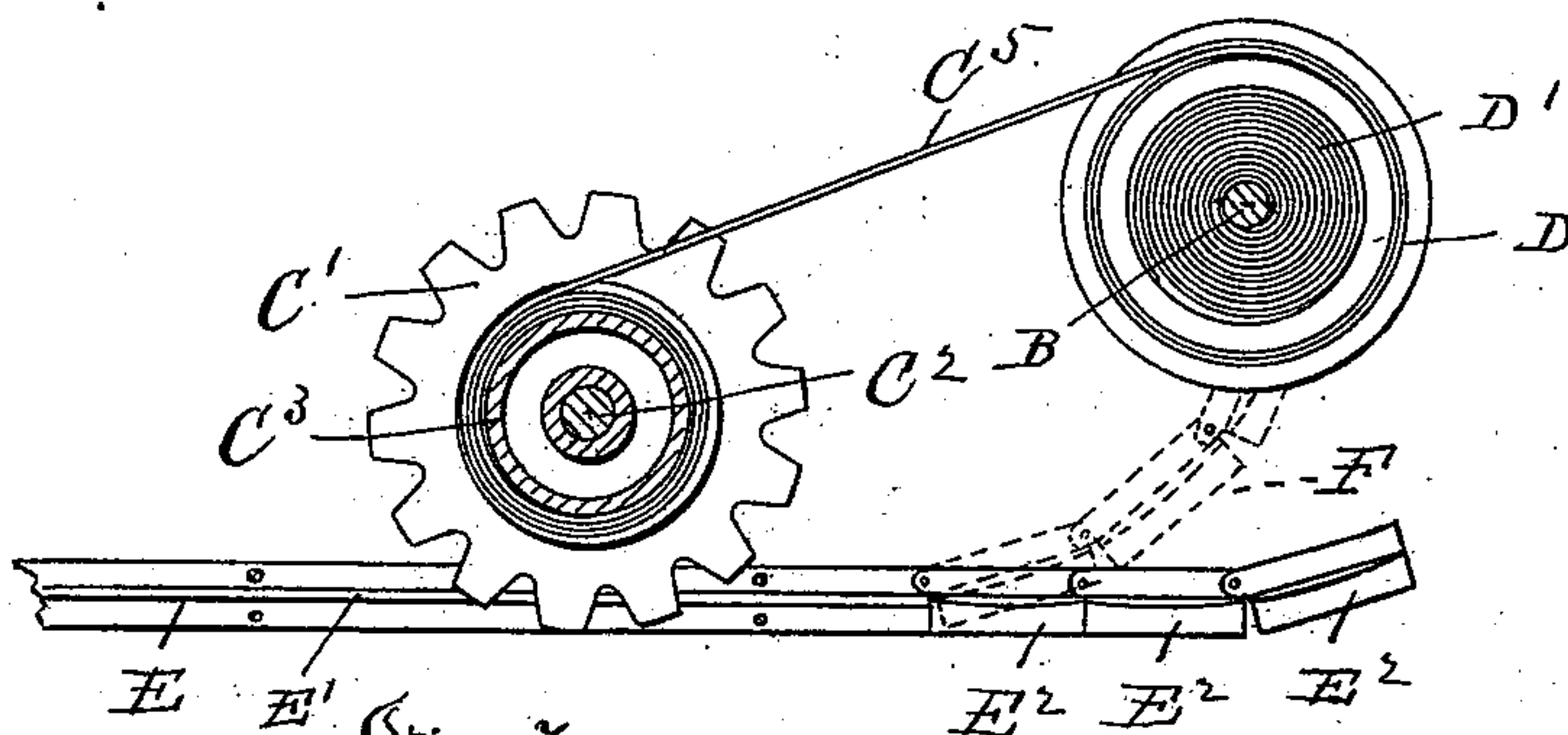


Fig. 7.

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UNITED STATES PATENT OFFICE.

ALGENON S. SPAULDING, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO
THE FLEXIBLE DOOR AND SHUTTER COMPANY, OF PORTLAND, MAINE.

FLEXIBLE DOOR.

SPECIFICATION forming part of Letters Patent No. 541,696, dated June 25, 1895.

Application filed August 4, 1892. Serial No. 442,200. (No model.)

To all whom it may concern:

Be it known that I, ALGENON S. SPAULDING, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Flexible Doors, of which the following is a specification, reference being had to the accompanying drawings, forming a part of the same, and in which—

Figure 1 represents in front elevation a flexible door with a portion of the casing removed in order to disclose the connected mechanism by which the door is wound into a coil or roll within a pocket at the side of the door-opening. Fig. 2 is a top view of the jointed track upon which the door slides. Fig. 3 is a view of the lower end of the vertical rotating spindle around which the door is coiled, and representing one of the collars attached to the spindle, to which one edge of the door is connected. Fig. 4 is a transverse sectional view of the track on line 4, 4, Fig. 2. Fig. 5 is a top view of the flexible door as partially coiled around the vertical rotating spindle and within the inclosing pocket; and also representing the connected operative mechanism by which the door is wound. Fig. 6 represents in side view that part of the operative mechanism shown in Fig. 5, a portion of the upper supporting frame having been removed on line 6 6, Fig. 5; and Fig. 7 is a top view of the gear and the case inclosing the spring by which the door is wound; the top of the case and the flange upon the hub of the gear having been removed on line 7, 7, Fig. 6; and Fig. 7 also shows the relative position of the jointed track to the spindle around which the door is coiled.

Similar letters refer to similar parts in the different figures.

My invention relates to the connected operative mechanism by which a flexible door is wound into a coil and about a vertically rotating spindle, and it consists in the construction and arrangement of the several parts as hereinafter described and specifically pointed out in the annexed claims.

A denotes the body of the flexible door, which can be of any known form of construction; but which is represented in the accompanying drawings as composed of a series of

parallel strips, or leaves, preferably of wood, and hinged together at their edges.

B is a vertical rotating spindle conveniently placed within a pocket B' at the side of the door-opening. The lower end of the spindle is preferably conical, or pointed, as at B², Fig. 3, and rests upon a step B³. The upper end of the vertical spindle is journaled in a bearing B⁴ in the end of a screw threaded bolt B⁵, which enters a screw threaded boss B⁶ of the metallic frame B⁷, which is securely attached to the inner sides of the pocket B'.

Attached to the spindle B are collars B⁸, one of which is shown in Fig. 3. To these collars the edge of the door is attached and about them the first coil of the door is wound as the spindle B is rotated.

Each of the strips, or leaves of the door A, is provided with pins C projecting a short distance from the upper end of the leaves and engaged by the teeth of the gear wheel C', which turns upon a stud C² held in the frame B⁷. The hub of the gear C' forms a drum C³ having a flange C⁴. To the hub C³ is attached one end of the metallic band, or ribbon C⁵, the opposite end of which is attached to the hollow drum D, which turns loosely about the spindle B and incloses a clock-spring D' having one end attached to the spindle B, and the opposite end attached to the inside of the hollow drum D.

The arrangement of the gear C', band or ribbon C⁵, drum D and inclosed clock-spring D', is such that when the door is pushed in the direction of the arrow 1, Figs. 1 and 5, the gear C' will be rotated in the direction of the arrow 2, causing the metallic band C⁵ to be wound upon the drum C³ and unwound from the hollow drum D rotating the drum upon the spindle B and causing the clock-spring D' to be coiled up, so its tension will be applied to rotate the spindle B, and cause the door to be wound up; the pins C acting as a rack to rotate the gear C' and coil up the spring D'; and the tension of the spring when so coiled, is applied to rotate the spindle B and coil up the door.

In setting up the door the coiled spring inclosed in the drum D is wound up so the tension of the coiled spring will be nearly, but not quite sufficient to overcome the weight

and friction of the open door, so the door will not be wound up by the tension of the spring, except as the door is closed in the direction of the arrow 1, Figs. 1 and 5 when the pins C will rotate the gear wheel and through the metallic band C⁵ the drum D, so as to still further wind up the spring and cause it to rotate the spindle and wind up the door as it passes by the gear wheel.

Upon the floor I place a track E, consisting of a metallic plate, provided with a central rib E', which enters the groove in the lower edge of the door. Between the side casings of the door, the track E may be formed of a single continuous strip, as the door is always moved in a straight line, but as the track approaches the rotating spindle B, its inner end is jointed, or formed of a series of links E² hinged together, in order to allow the door to be delivered to the coil upon which it is wound at a tangent to the periphery of the coil.

The position of the jointed section of the track, as the winding is begun is represented by the broken lines F, Fig. 7 and as the coil increases in diameter by the winding of the door, the jointed section assumes the position represented in Fig. 7 by solid lines.

The straight portion of the track is fastened to the floor, or threshold and the jointed section is left free to move laterally with the door and as the ribs E' upon the links E² enter the groove in the lower edge of the door, the door is held from "buckling" and is conducted over the jointed section of the track from the straight section, to the coil.

The lower end of the spindle B is supported upon a fixed step B³, but the upper end is held by the bolt B⁵ which is capable of a lateral adjustment, so as to cause the spindle B to be held in a true vertical position or slightly inclined, in order to raise or lower the free edge of the door and bring its lower edge parallel with the track E. The spindle B is held in its upper bearing by a cap G provided with gibbs G' inclosing the tapering sides G² of the head of the bolt B⁵ and is held from sliding

vertically by a set screw G³. This arrangement of the cap G permits it to be radially removed for the purpose of withdrawing the spindle B.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination with a flexible door and a spindle around which said door is wound, of a spring operatively connected with said spindle, so its tension will cause the spindle to rotate and wind up the door, and intermediate connecting mechanism between said spring and said flexible door, whereby said spring is wound up by the lateral movement of the door as it is opened, substantially as described.

2. The combination with a rotating spindle, and a flexible door attached at one edge to said spindle and provided with a series of projecting and equi-distant pins, of a gear wheel engaged by said pins, so as to be rotated by the lateral movement of the door in opening, or closing, a drum attached to said gear wheel, a hollow drum turning on said spindle, a spring inclosed in said hollow drum and operatively connected with said drum and said spindle, and a flexible band connecting said hollow drum, and the drum on said gear wheel, whereby the rotation of said gear wheel will rotate the hollow drum and wind the inclosed spring during the process of opening the door, substantially as described.

3. The combination with a flexible door, and a spindle around which said door is wound, of a track E provided with a jointed section comprising the links E², said jointed section being capable of a lateral movement, whereby the flexible door is conducted over said jointed track, in a line substantially tangential to the coil upon which it is to be wound, substantially as described.

Dated this 30th day of July, 1892.

ALGENON S. SPAULDING.

Witnesses:

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H. W. FOWLER.