

No. 637,458.

Patented Nov. 21, 1899.

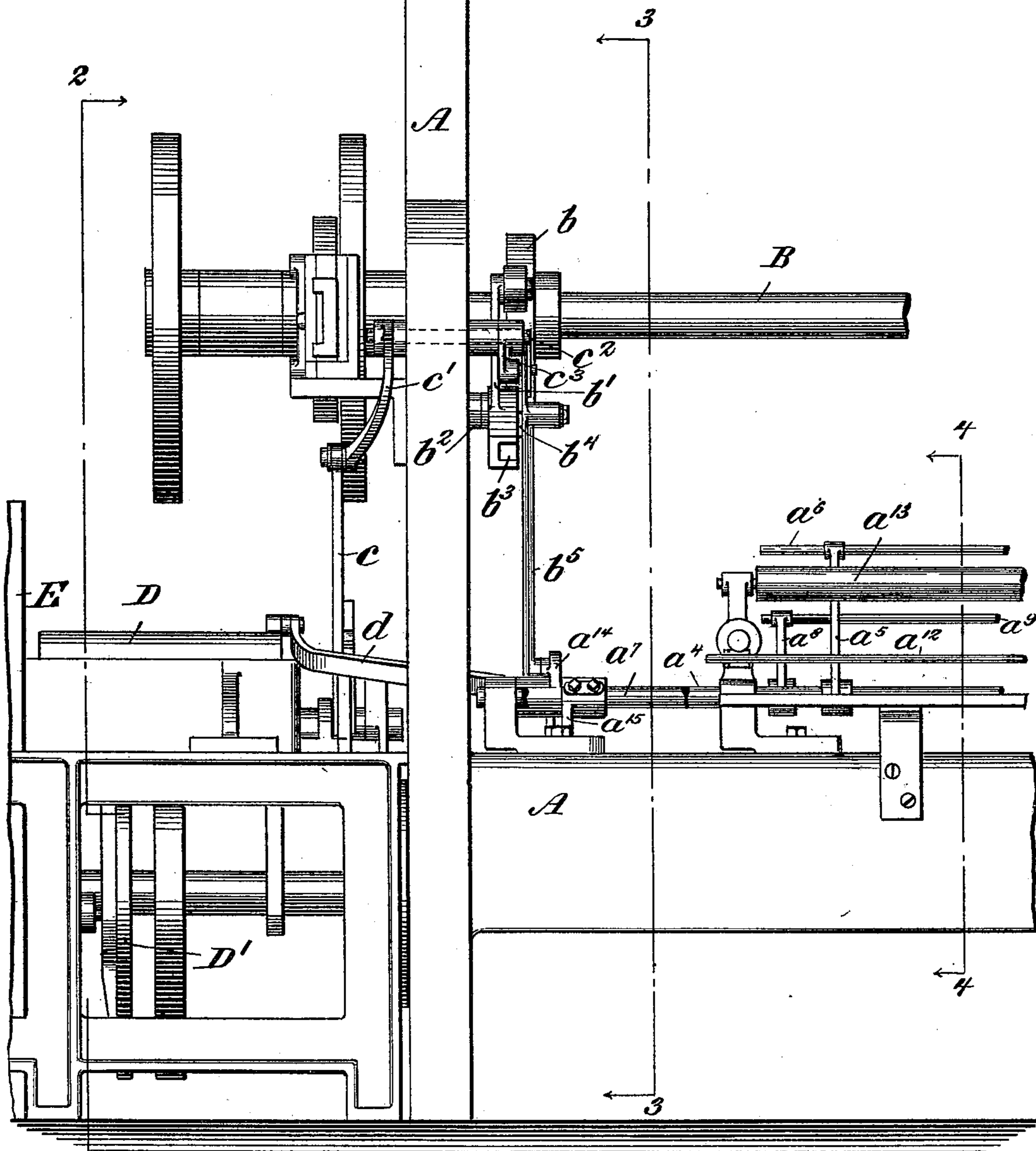
J. A. GROEBLI.
EMBROIDERING MACHINE.

(Application filed Oct. 3, 1898.)

(No Model.)

4 Sheets—Sheet 1.

Fig. 1.



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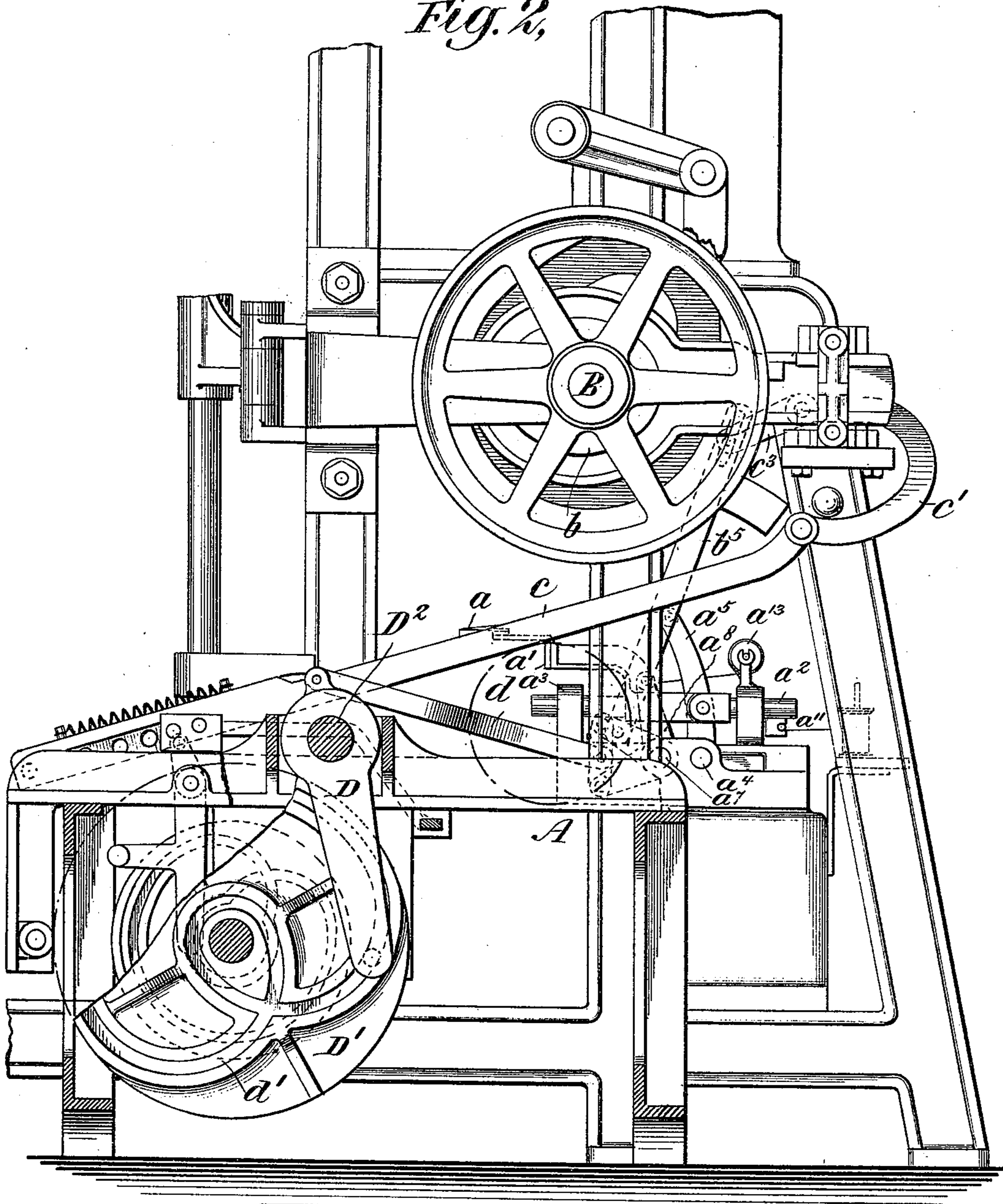
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Fig. 2,



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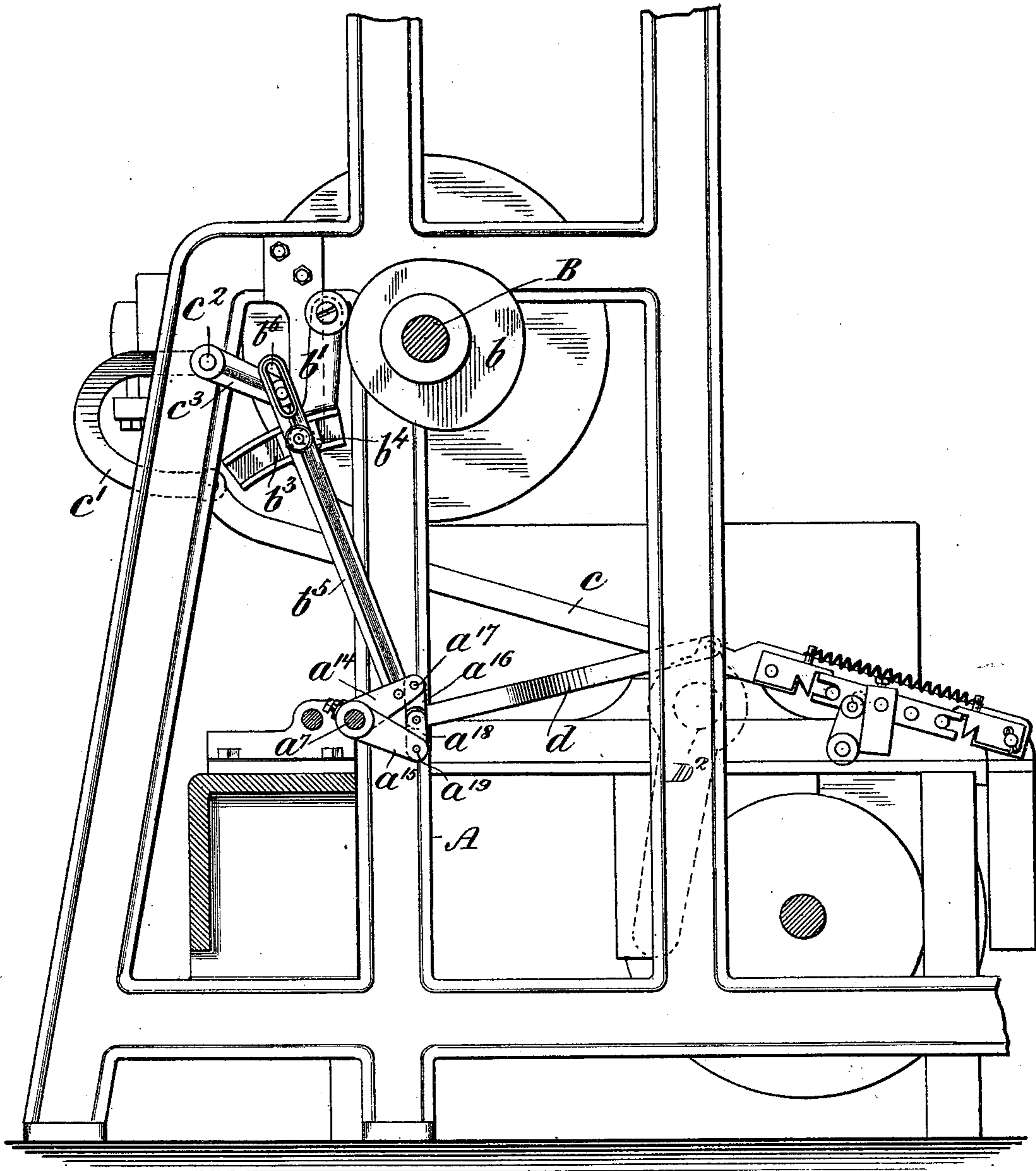
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(No Model.)

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Fig. 3.



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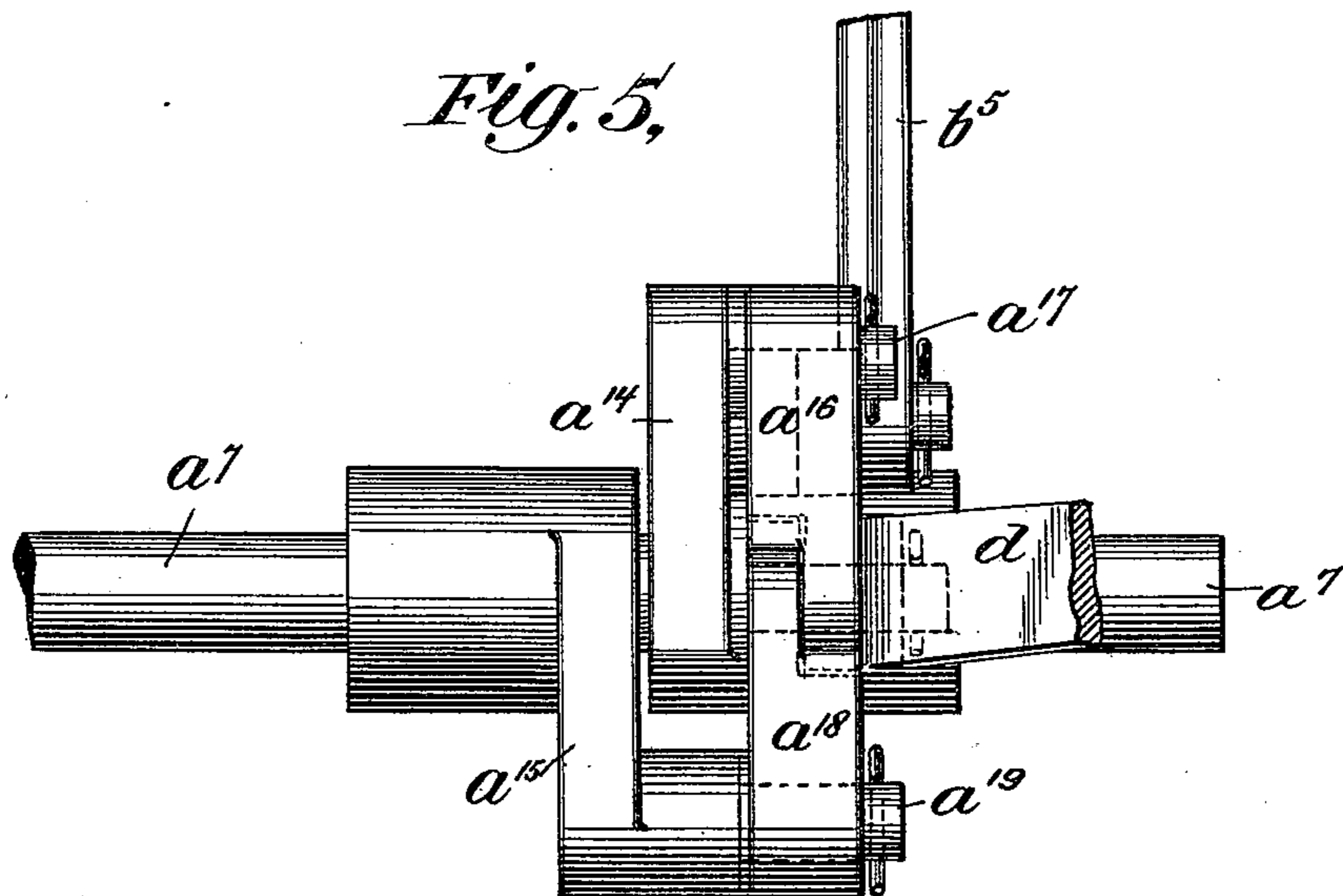
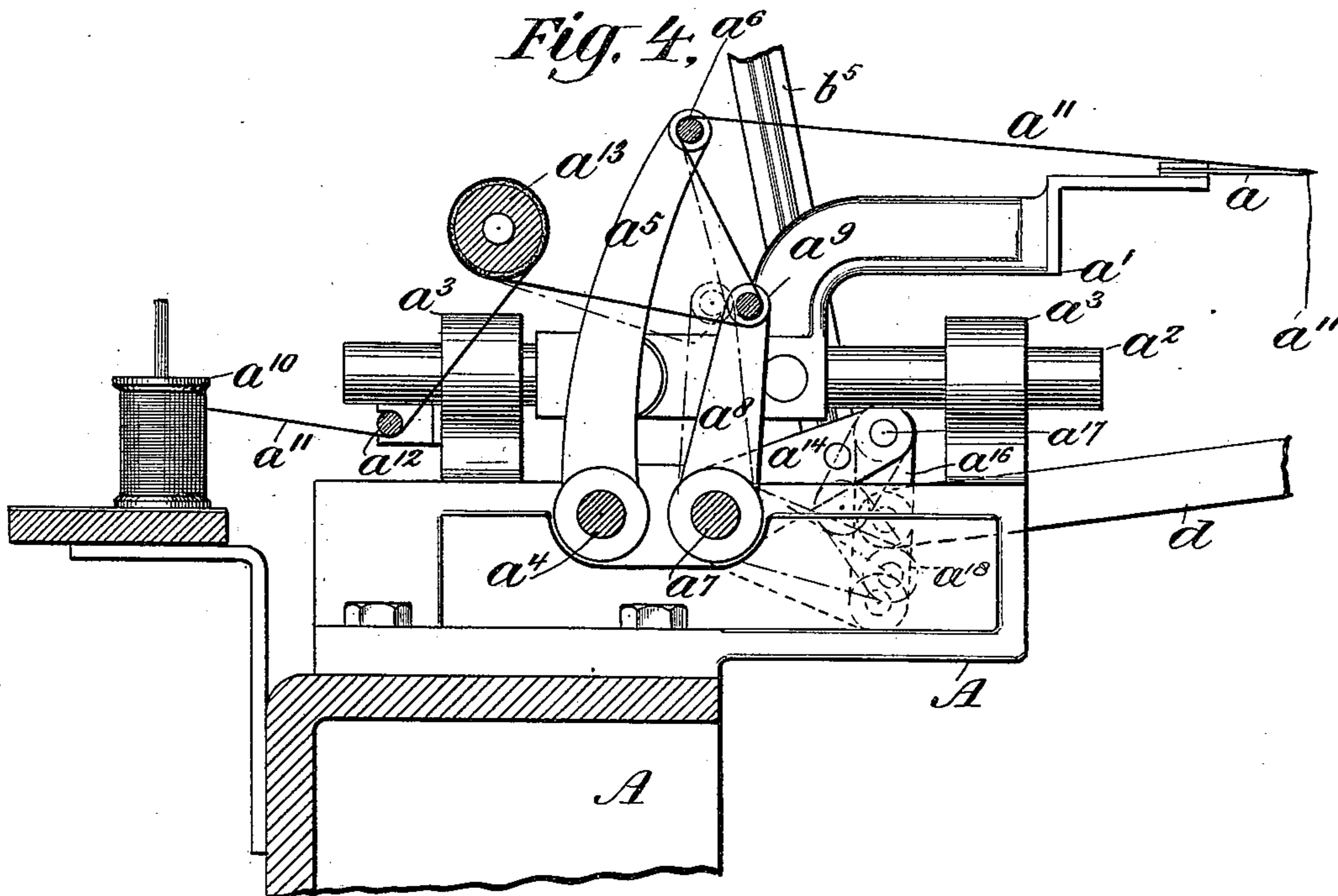
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4 Sheets—Sheet 4.



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UNITED STATES PATENT OFFICE.

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EMBROIDERING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 637,458, dated November 21, 1899.

Application filed October 3, 1898. Serial No. 692,500. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH A. GROEBLI, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Embroidering-Machines, of which the following is a specification.

My invention relates to embroidering-machines, and has for its object to produce an embroidering-machine wherein provision is made for letting out or slackening the threads during the boring or other operations and for taking up the said threads after the said operation when the sewing operations are to be resumed.

My invention will be understood by referring to the accompanying drawings, in which—

Figure 1 is a front elevation of the end of an embroidering-machine of the now well-understood Groebli type. This figure shows also a portion of the jacquard mechanism for controlling the said embroidering-machine. Fig. 2 is a sectional end elevation of the machine shown in Fig. 1, the section being taken on the line 2 2 of Fig. 1. Fig. 3 is a sectional elevation of the end frame of the machine, the section being taken on line 3 3 of Fig. 1. Fig. 4 is an enlarged detail sectional view of the thread slackening and take-up device employed in the machine illustrated, and Fig. 5 is an enlarged plan view of the toggle mechanism used in the present instance.

It will be understood that in these drawings I have shown but one form in which my invention may be clothed. This form represents the best construction for the purpose at present known to me. I would have it understood, however, that this construction may be departed from without departing from the spirit of my invention. Before proceeding to describe this preferred form, which I shall do minutely, I should like to state the general purpose and operation of the said device.

In modern embroidering-machines of the Groebli type provision has been made for automatically boring the fabric on the tambour-frame in conjunction with the sewing devices. It has been customary to locate the boring mechanism in the machine at a lower level than the needles, so that in order to bore out a figure which is to be embroidered by the

needles it is necessary to drop the frame, or if the boring devices are otherwise located to otherwise move the frame to bring the embroidery into operative relation with the boring devices. It will be obvious that when the tambour-frame is thus moved the needle-threads will be drawn through the needles and their auxiliary devices and when the tambour-frame is replaced in its original position the slack of these threads will hang down in a loop between the needle and the fabric-frame. It will be obvious that upon the next entry of the needle into the fabric this loop will impede the proper action thereof, as the take-up devices will not properly take up the slack in the threads, so that the stitch will not be properly formed. In order to overcome these difficulties, I have devised means by which the needle-threads may be slackened or paid out and taken up at the proper time.

I invite the reader's attention to Fig. 4, wherein a represents a needle or gang of needles carried upon a needle-bar a' , supported by the slide a^2 , sliding in the guides a^3 , borne upon the main frame A of the embroidering-machine. A suitable shaft a^4 carries arms a^5 . This shaft carries two or more of these arms a^5 , which carry at or near their extremities a thread-take-up bar a^6 . This thread-take-up bar is called by the trade the "primary" take-up wire. Another shaft a^7 carries arms a^8 , of which there are several, which arms a^8 carry a bar or wire a^9 , known as the "secondary" take-up wire. The thread a^{11} passes from the spool a^{10} under the guiding-wire a^{12} , around the tension-roller a^{13} , under the secondary take-up wire a^9 , and over the primary take-up wire a^6 , and thence to the needle. It will be understood that the take-up wires may be given a suitable normal swinging motion in any desired manner to cooperate with the sewing devices at every stitch. In the present instance, as the designed slackening and taking up is accomplished primarily by the secondary take-up wire, I have merely shown in detail the means for effecting the normal swing of said wire, which swing takes place when the needle-bar is in operation and may be effected as follows: A cam b upon the main shaft B of the embroidering-machine imparts motion to an arm b' ,

which swings upon a boss b^2 (see Fig. 1) on the main frame A of the embroidering-machine. I am now referring particularly to Figs. 1 and 3. This arm b' is provided with a slotted arc b^3 , which receives a block b^4 , carried upon a link b^5 , which is connected to an arm a^{14} , loosely fixed upon the shaft a^7 , upon which the arm a^8 , carrying the take-up wire a^9 , is secured. The rotation of the cam b swings the arm b' , which turns upon its pivot b^2 , reciprocating the link b^5 and swinging the arm a^{14} , carried loosely upon the shaft a^7 . The extent of the swing of this arm is regulated by adjusting the block b^4 in the arc b^3 , which adjustment may be effected from the jacquard by means of the operating-link c , which swings the lever c' , carried upon the shaft c^2 , which carries the arm c^3 , which engages the slot b^6 in the link b^5 . The arm a^{14} , loose upon the shaft a^7 , and the arm a^{15} , fast upon the said shaft, are connected by a toggle-joint comprising the link a^{16} , pivoted at a^{17} to the arm a^{14} , and the link a^{18} , pivoted at a^{19} to the arm a^{15} , the other ends of the two said links being pivoted to each other after the manner of an ordinary toggle-joint. It will be obvious that when the links of the toggle-joint are in line, as shown in Figs. 2, 3, and 4, the reciprocating movement of the link b^5 will swing both arms a^{14} and a^{15} , and thereby swing the shaft a^7 and operate the take-up wire a^9 , which operation is the ordinary normal take-up action occurring during the stitching operations of the embroidering-machine. My object in providing the links a^{16} a^{18} , which constitute part of my invention, is to enable the abnormal slackening and take-up motions to be imparted to the take-up wire at the occurrence of the boring operations. This slackening and take-up motion above described is imparted by moving the links a^{16} a^{18} . It will be obvious that when the links a^{16} and a^{18} are in line with each other, as shown in Figs. 2, 3, and 4, the take-up wire a^9 will be in its extreme position, and when the toggle-joint is collapsed, as shown in dotted lines in Fig. 4, the arm a^{15} and its connected shaft a^7 will be swung, thereby retracting or throwing the arm a^8 into the position shown in dotted lines in Fig. 4, so that when the fabric-frame is about to be moved into the boring position the toggle-joint is collapsed automatically into the position shown in dotted lines in Fig. 4, whereupon the take-up wire a^9 is swung to the left (see Fig. 4) or retracted, and the thread is slackened, so that it will be pulled freely through the needle when the fabric-frame moves to position itself for the boring operation. When the boring operation has ceased and the fabric-frame has moved back to its initial position, the toggle-joint is automatically straightened out, so that the links thereof will be in line with each other, whereupon the take-up wire a^9 is swung back to its initial position and takes up the slack in the thread which was slackened by the abnormal slackening oper-

ation just described, so that the threads are at proper tension for the operation of the stitch-forming mechanism. This toggle-joint may be variously operated, preferably by means of a bar d , shown as pivoted at one end to the junction-point of the toggle-levers and at its other end to a lever D, which lever D may be any suitable movable part of the embroidering-machine, but is preferably the part which initiates the embroidering-machine-disconnecting mechanism, being operated by the cam D' through the intervention of jacquard mechanism E, such as is fully described in United States Letters Patent No. 593,208, dated November 9, 1897. I prefer to connect the toggle-joint-operating mechanism to the mechanism for initiating the disconnecting, as my present invention is so nearly allied to the boring mechanism. It may, however, be connected to other mechanism, and for the purposes of the present invention the lever D may be considered as an arm carried upon a shaft D^2 and operated by the cam-slot d' on cam D' , with which it is engaged at predetermined times by the jacquard, as will be fully understood by an inspection of my said patent, to which I beg leave to refer for a fuller description thereof. The means for moving the fabric-frame to effect the boring and the boring mechanism I prefer to make according to the Groebli system—that is to say, I prefer that all the actions should be automatic. Constructions for these purposes are shown in my United States Letters Patent No. 528,632, dated November 6, 1894, and No. 556,143, dated March 10, 1896, to which reference is hereby made for greater certainty.

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

1. An embroidering-machine comprising in its structure a stitch-forming mechanism, a pair of take-ups with operating means therefor, executing the usual take-up movements at every stitch, and positively-actuated means for automatically operating one of the said take-ups to slacken the thread in excess of its normal slackening movement and to thereafter take up the said slack.

2. In an embroidering mechanism, the combination of sewing mechanism, thread-stress mechanism for the sewing mechanism and jacquard mechanism combined with intervening mechanism affected by the jacquard mechanism to effect take-up and slackening motions of the thread at predetermined times other than at the formation of every stitch.

3. In an embroidering-machine, the combination of sewing mechanism, take-up wire a^9 with means for normally operating the same comprised in part by toggle mechanism and means for collapsing the toggle mechanism to operate the said wire a^9 to effect an additional take-up and slackening operation, substantially as described.

4. In an embroidering-machine, the combination of sewing mechanism, a take-up wire

provided with normal operating means comprised in part by toggle mechanism and jacquard mechanism for collapsing the said toggle mechanism to operate the said take-up wire to effect a take-up and slackening operation in addition to the normal operation thereof, substantially as described.

5. In an embroidering-machine, the combination of stitch-forming mechanism, with a two-part take-up mechanism, with means for causing the same to execute their normal movement to take up the thread to set each stitch, combined with jacquard - operated means for causing an abnormal movement of one element or part of the take-up mechanism at predetermined times to effect an abnormal slackening of the thread.

6. In an embroidering-machine, the combination of stitch-forming and thread-take-up mechanism and mechanism for bringing about

an abnormal operation of the take-up mechanism at predetermined times, and jacquard mechanism controlling the mechanism for bringing about an abnormal operation of the take-up mechanism.

7. In an embroidering-machine, the combination of stitch-forming mechanism, with primary and secondary take-up wires, and means for normally operating the same to take up the thread at every stitch, and jacquard mechanism combined with intervening mechanism between the jacquard mechanism and the take-up mechanism to effect an abnormal operation of the take-up mechanism at predetermined times.

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Witnesses:

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