

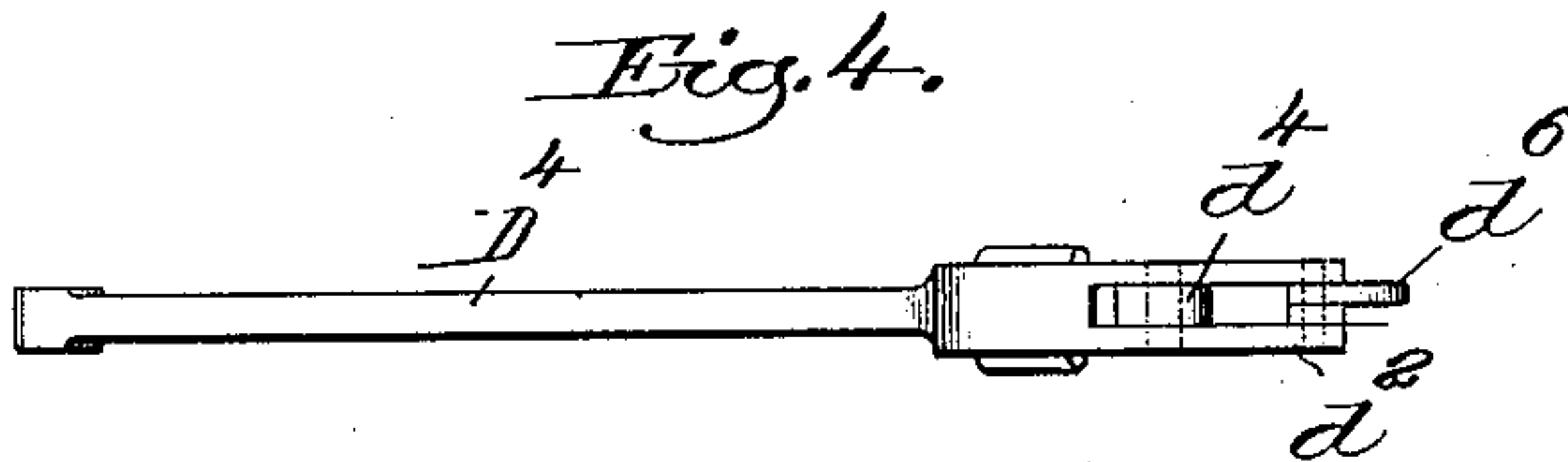
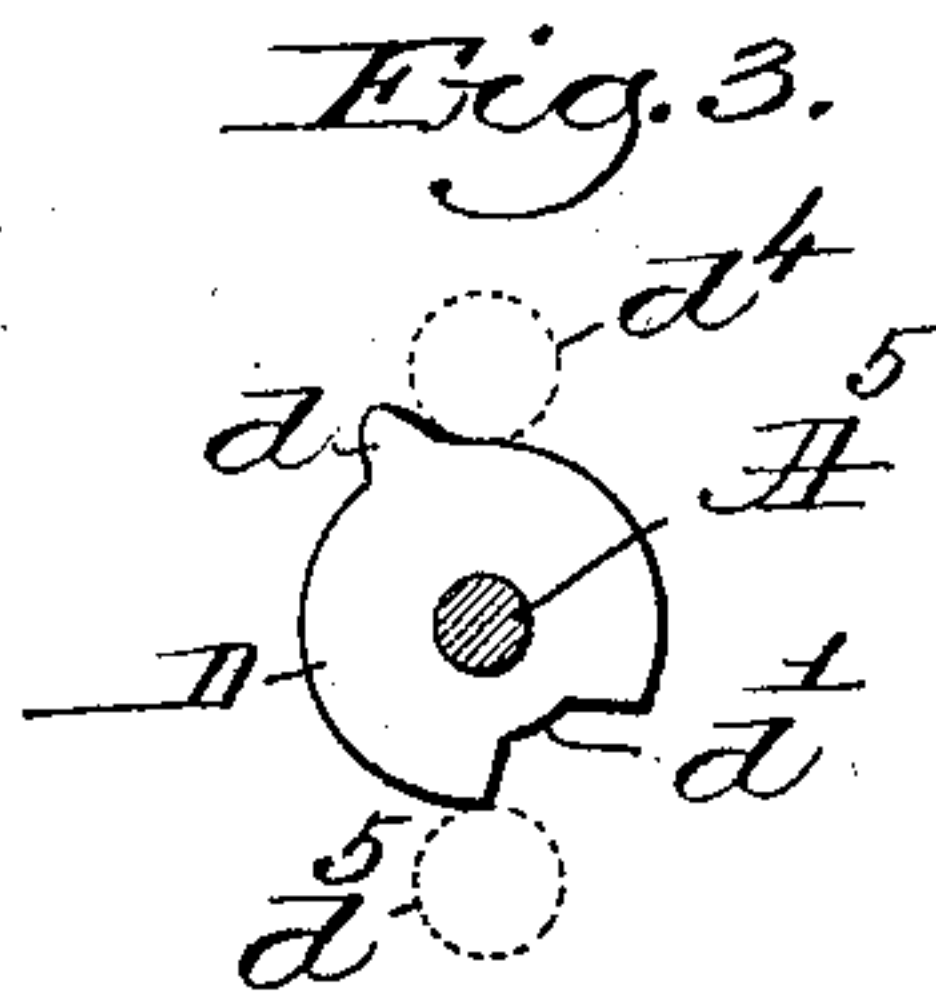
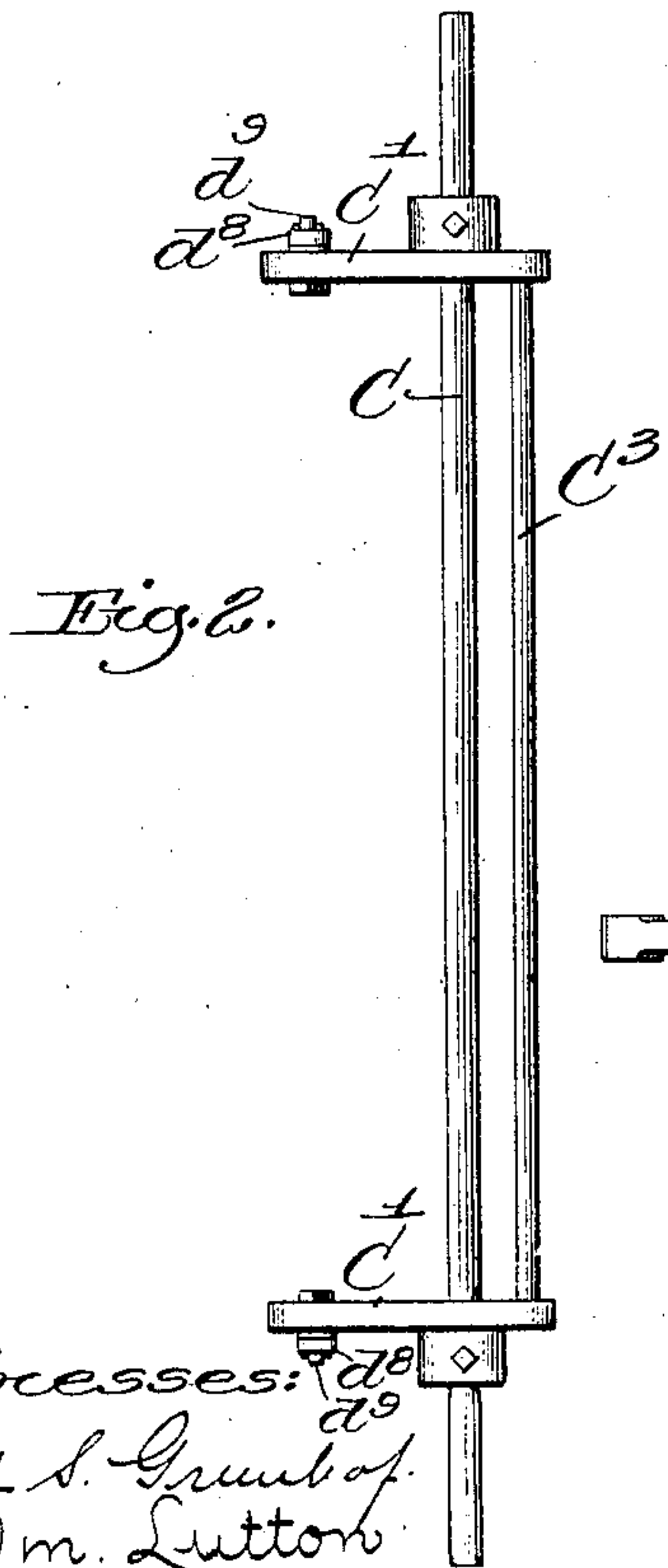
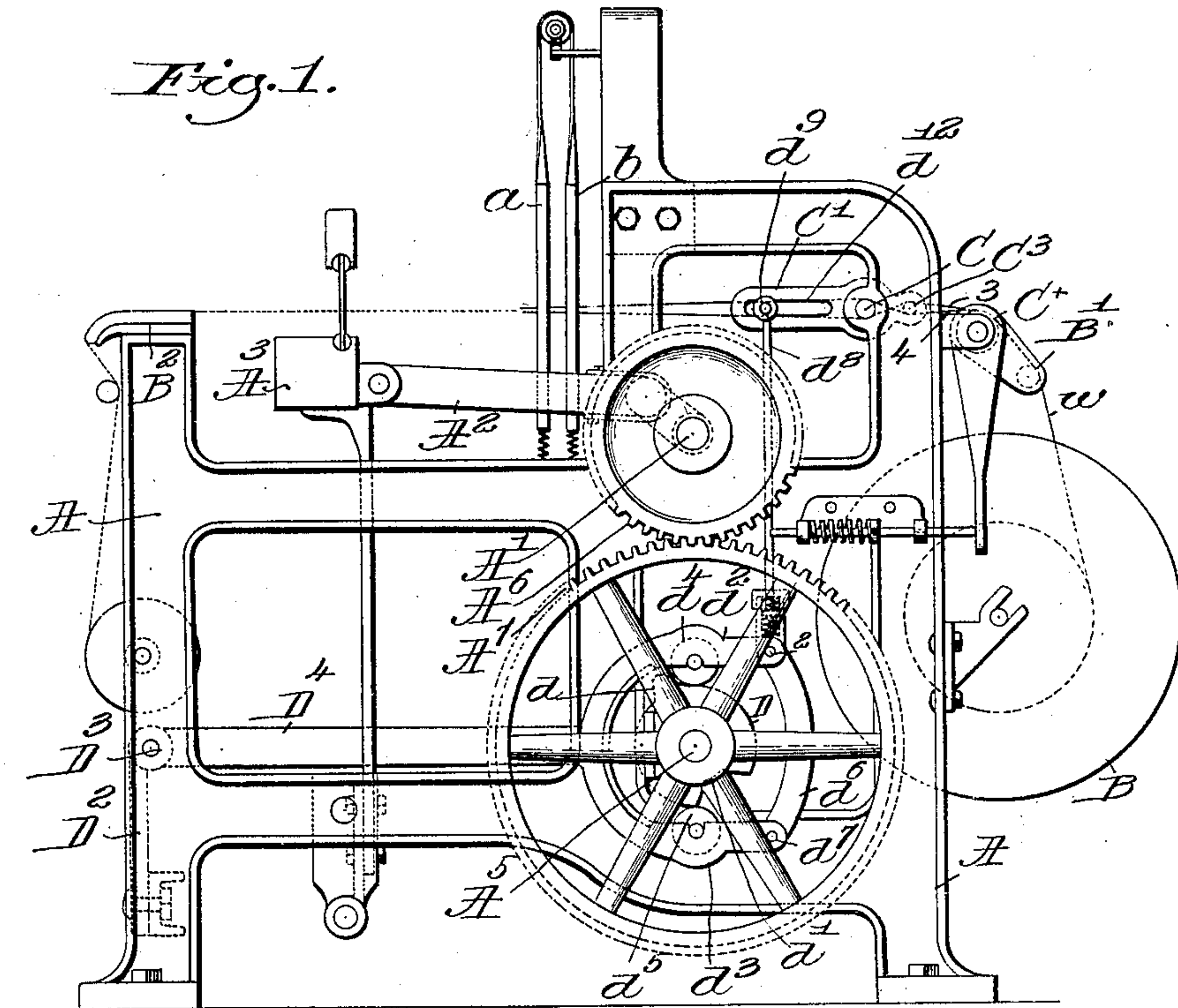
No. 763,628.

PATENTED JUNE 28, 1904.

A. PETERSEN.
WARP PULLER FOR LOOMS.
APPLICATION FILED JAN. 2, 1904.

NO MODEL.

3 SHEETS—SHEET 1.



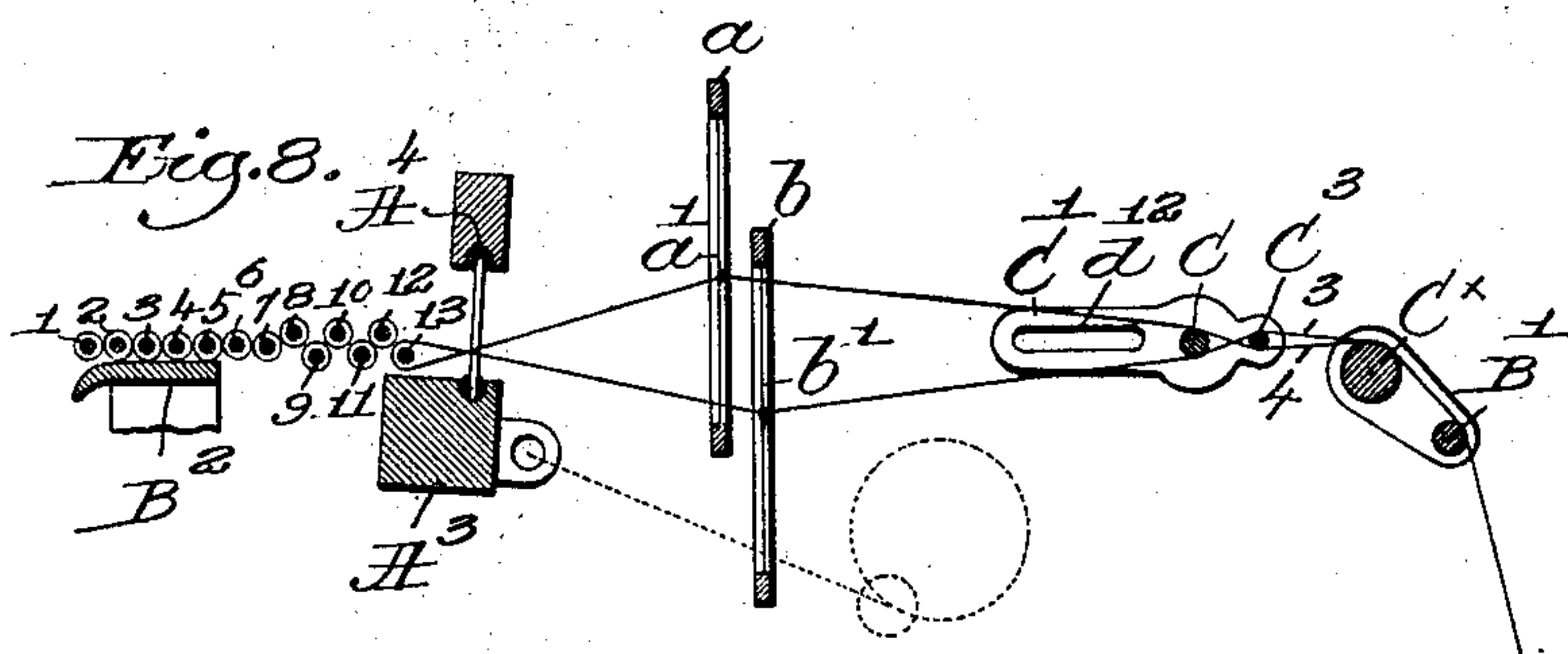
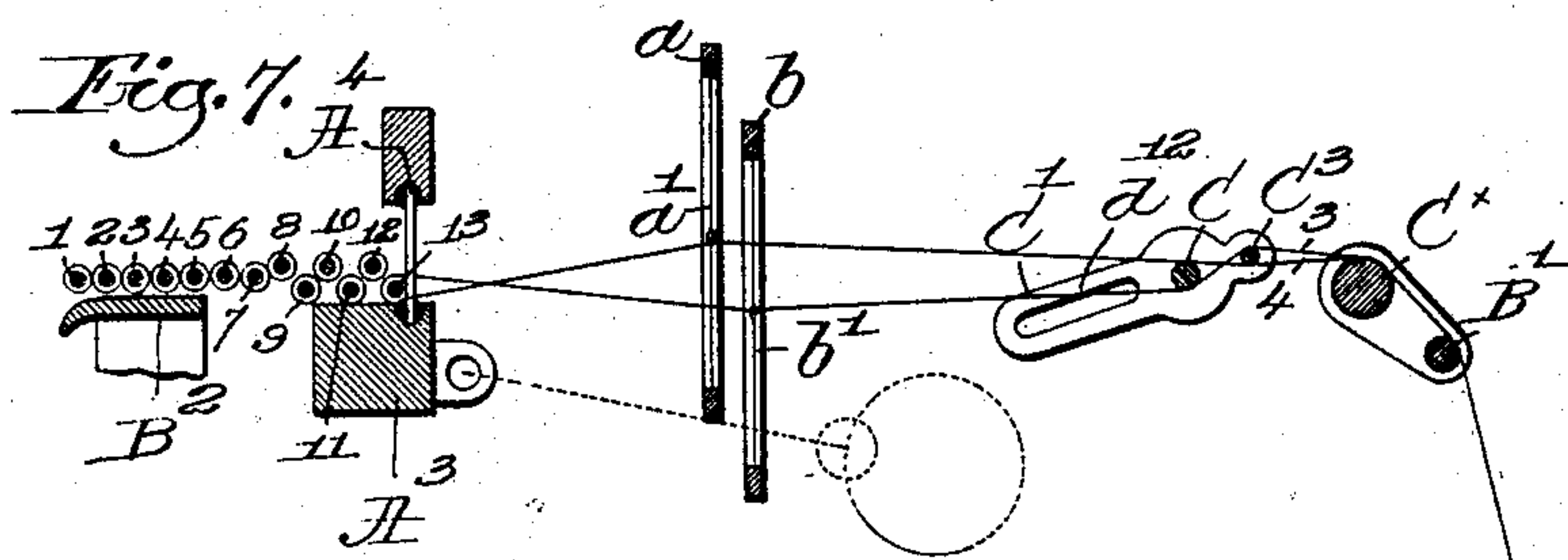
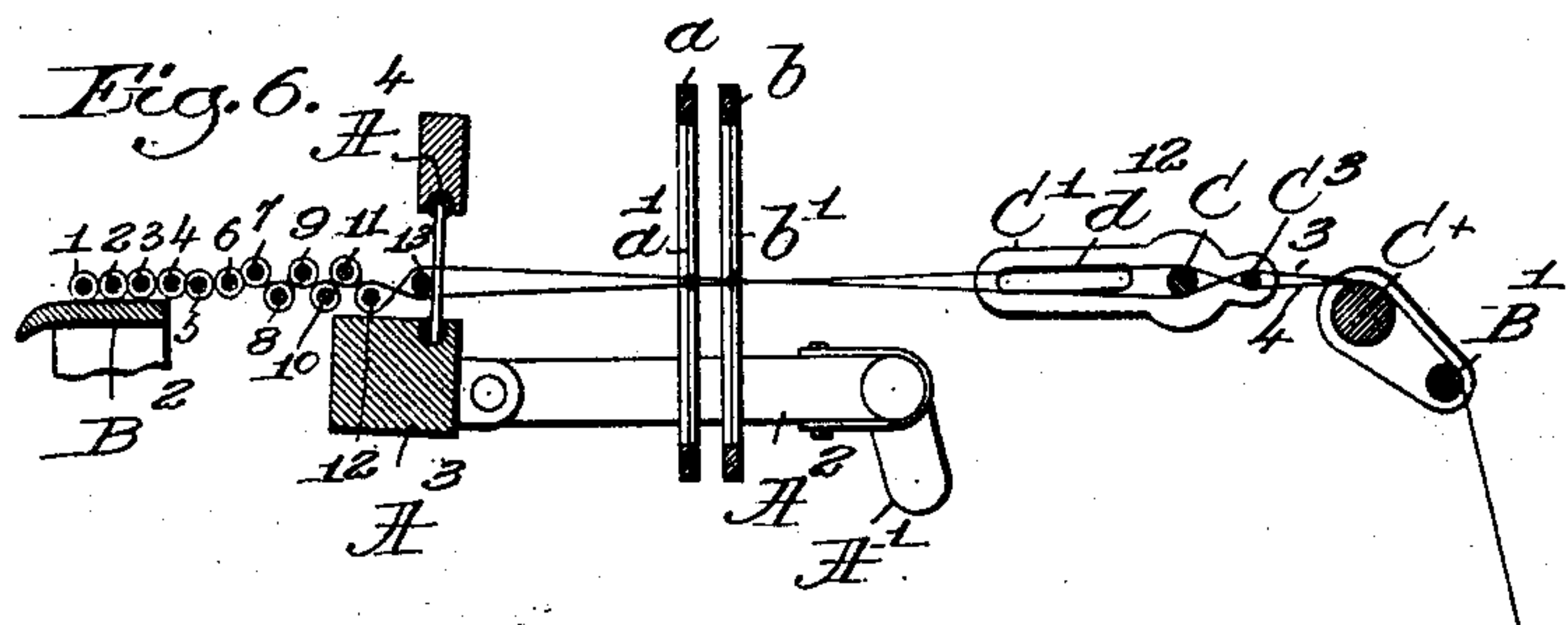
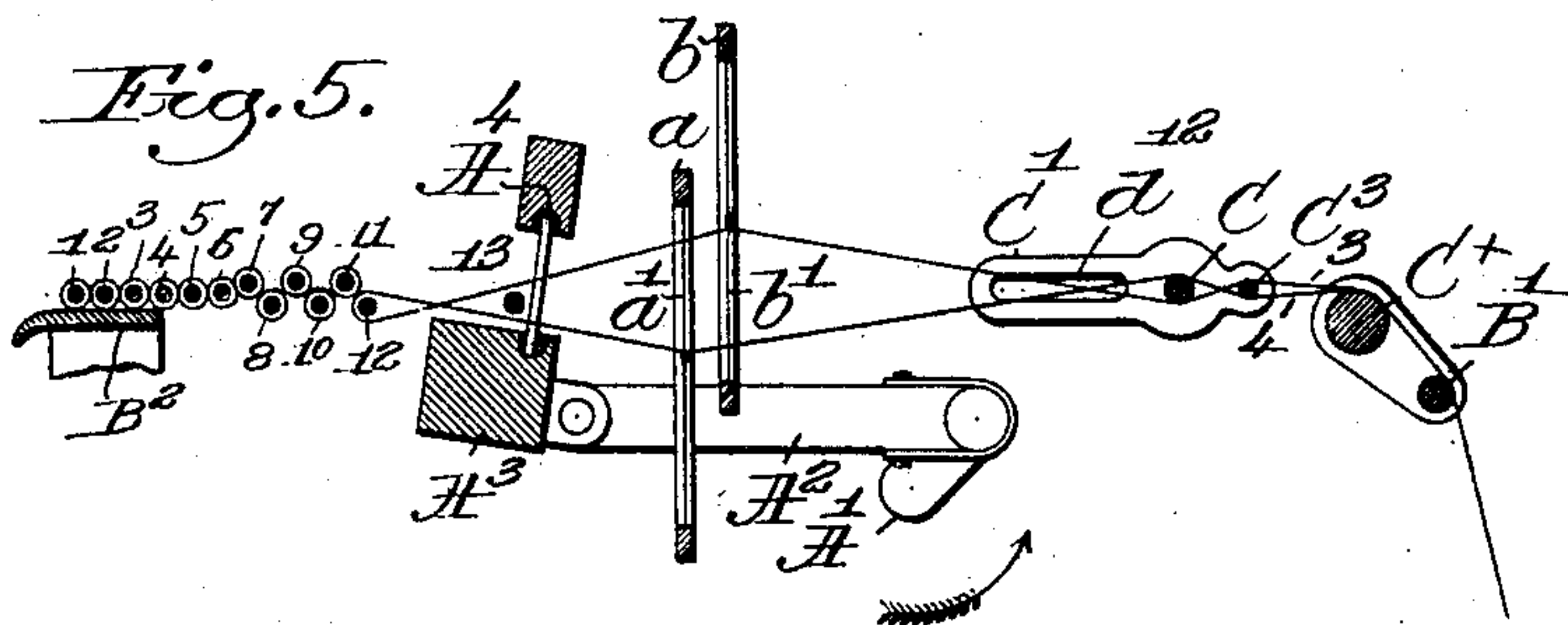
witnesses:
Fred S. Grumbel
G. Wm. Lutton

Inverdon.
Arker Petersen,
by *Ernest Meyer*
attys.

A. PETERSEN.
WARP PULLER FOR LOOMS.
APPLICATION FILED JAN. 2, 1904.

NO MODEL.

3 SHEETS—SHEET 2.



Witnesses:

Fred S. Grunhof.
J. Wm. Lutton.

Inventor,
Arker Petersen,
by *Deaby & Sugny*
attys.

No. 763,628.

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NO MODEL.

3 SHEETS—SHEET 3.

Fig. 9.

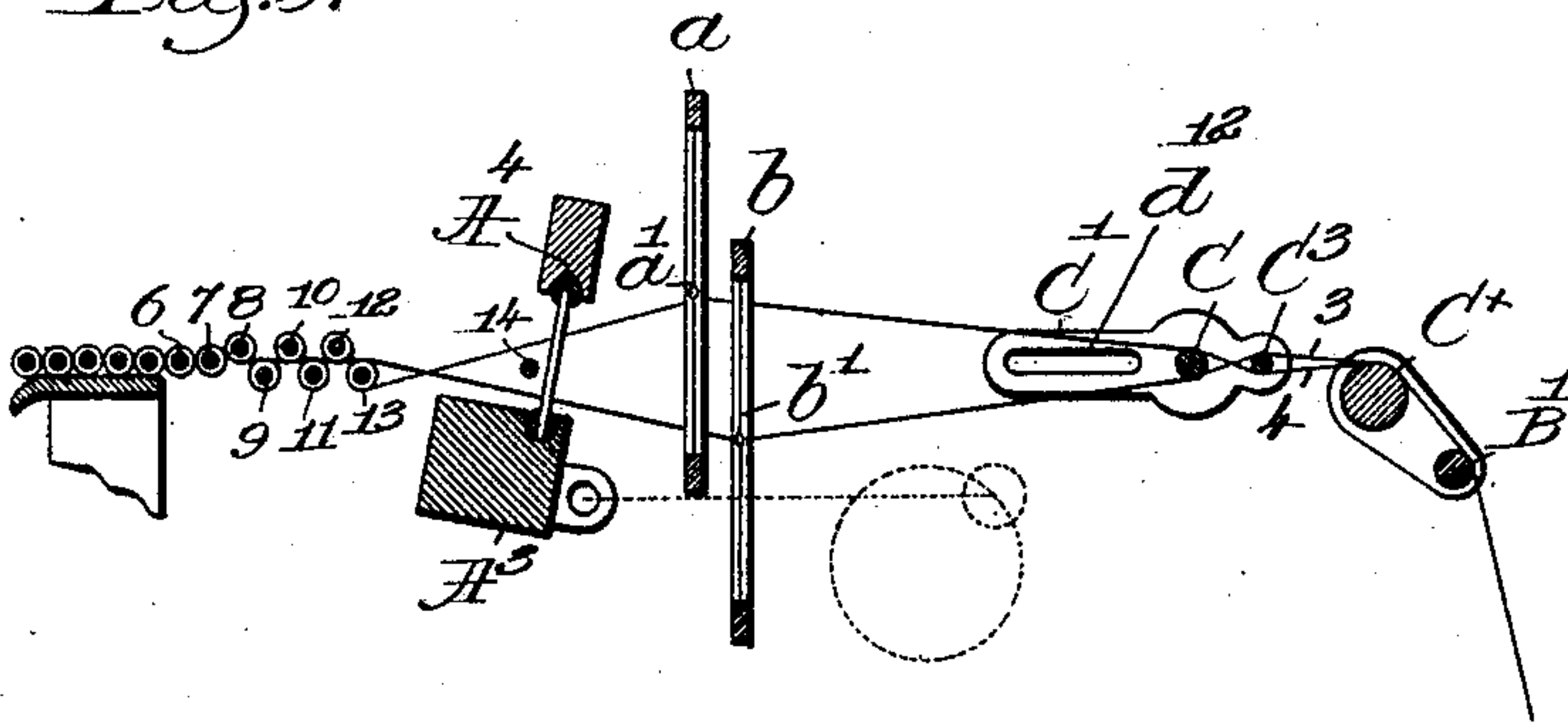


Fig. 10.

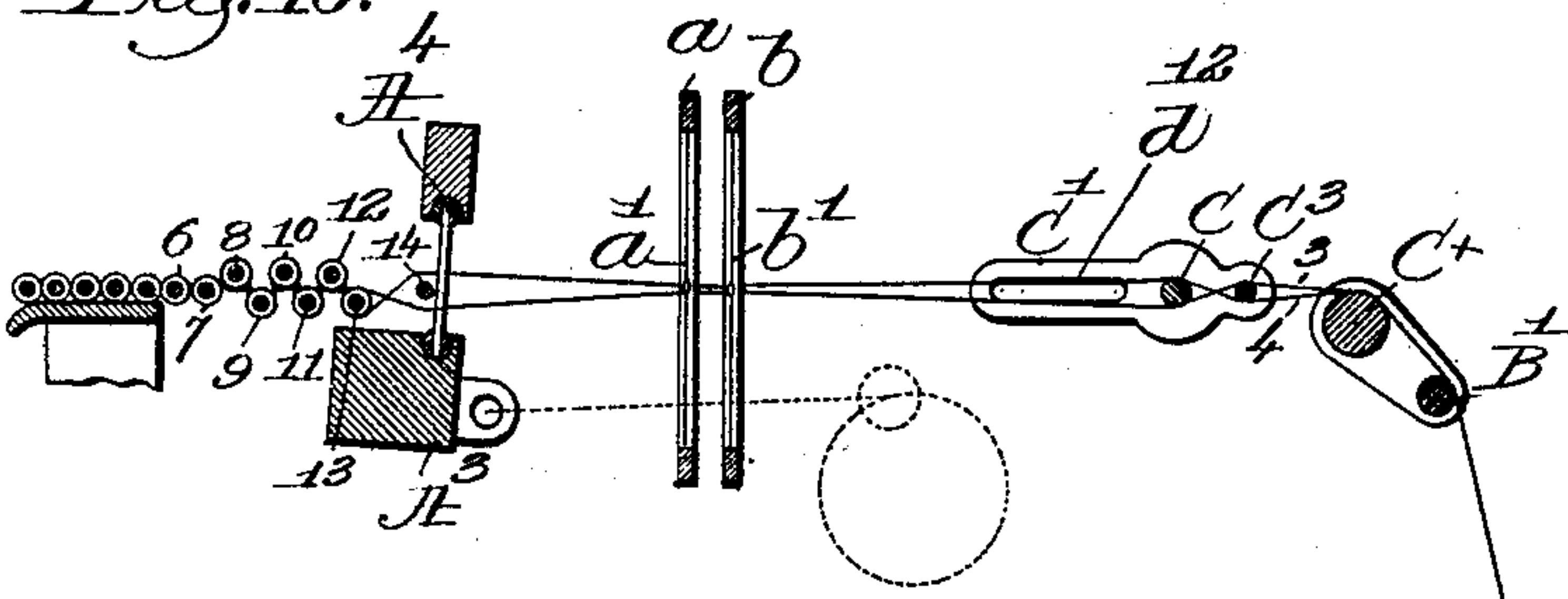
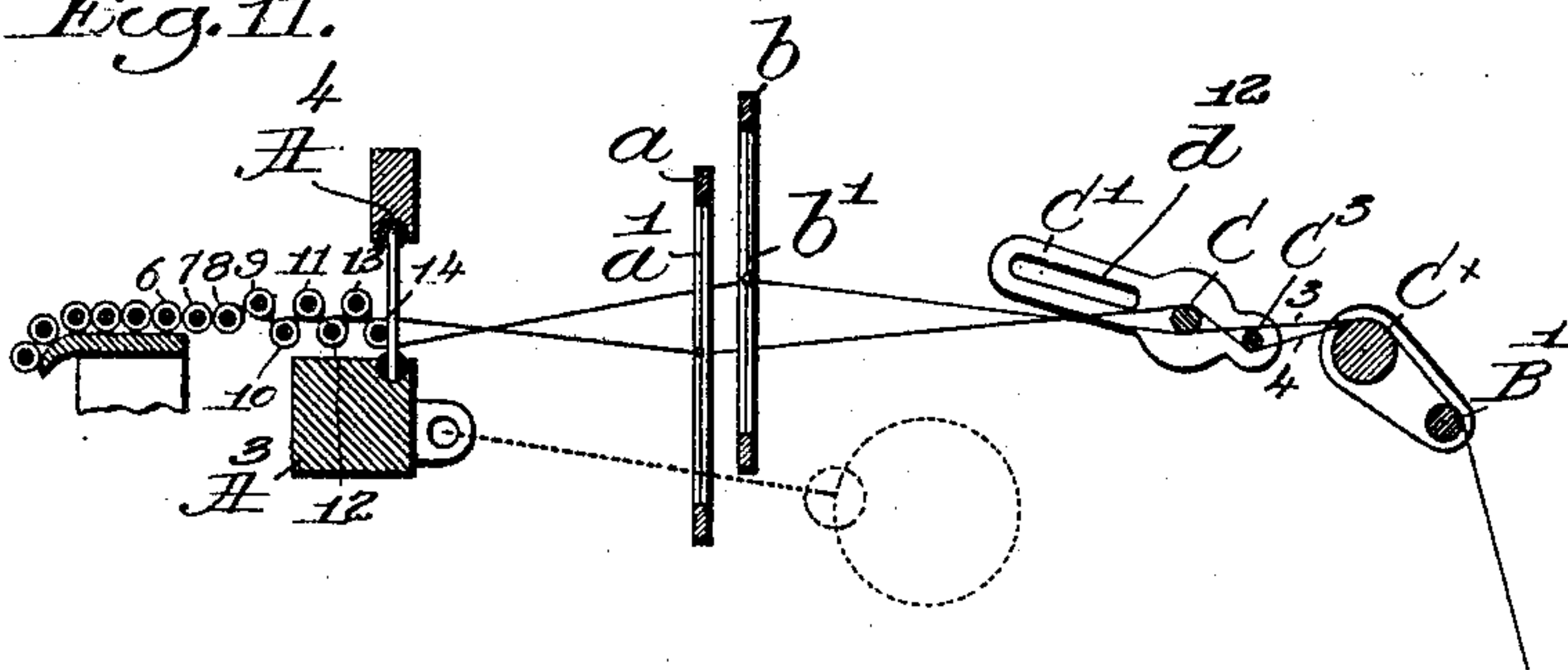


Fig. 11.



Witnesses:

Fred S. Grumbaf.
J. Wm. Lutton.

Inventor.

Arker Petersen;
by Crosby & Rogers.
attys.

UNITED STATES PATENT OFFICE.

ANKER PETERSEN, OF BOSTON, MASSACHUSETTS.

WARP-PULLER FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 763,628, dated June 28, 1904.

Application filed January 2, 1904. Serial No. 187,513. (No model.)

To all whom it may concern:

Be it known that I, ANKER PETERSEN, a subject of the King of Denmark, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Warp-Pullers for Looms, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention has for its object the production of a loom in which the warp is manipulated in a novel manner while feeding in the filling to insure a more solid and firm fabric.

In accordance with my invention I insert in a lease of the shed a warp-puller shown as a rod that is moved as the lay is moved forward to feed in the filling to pull on all of the warp-threads crossing over it and at the next forward movement of the lay when feeding in filling will pull on all the warps crossing under it.

The particular features in which my invention consists will be hereinafter pointed out in the claims following the accompanying description.

Figure 1 is a cross-section of a sufficient portion of a loom embodying my invention to enable the same to be understood. Fig. 2 is a plan view looking down on part of the loom-frame and the warp-puller. Fig. 3 shows detached the cam for moving the warp-puller. Fig. 4 is a plan view of the lever D^4 detached, and Figs. 5 to 11 are diagrams showing the operation of the warp-puller in weaving.

The framework A, the crank-shaft A^1 , lay-connecting rod A^2 , the lay A^3 , having a reed A^4 , the cam-shaft A^5 , driven at half the speed of the crank-shaft through gears $A^6 A^7$, the warp-beam B, the whip-roll B^1 , the breast-beam B^2 , and the harness-frames $a b$, having heddles $a' b'$, are and may be all as usual in looms for weaving, and the harness-frames will in practice have imparted to them vertical movements to open and close the shed by any usual mechanism, such as cams and treadles.

In accordance with my invention I affix to a rock-shaft C, mounted to turn in bearings on the sides of the loom-frame, arms C' . Between the shorter ends of said arms, as shown, nearest the whip-roll I mount a rod C^3 . This rod,

arms, and rock-shaft constitute what I shall hereinafter designate as a "warp-puller." The actuating means for the puller is shown as a cam D, fast on the shaft A^5 , said cam having a toe d and a recess d' .

At the front of the lay, on a stand D^2 , I pivot at D^3 a lever D^4 , forked at its opposite end to leave, preferably, bifurcated arms $d^2 d^3$, the bifurcated portions of the forked end of said lever receiving between them each a roller-sheave $d^4 d^5$. The ends of the bifurcated arms for the sake of rigidity are united by a link d^6 , secured to the bifurcated ends of the lever by pins d^7 and 2. The pin 2 also connects with said lever a rod d^8 , that is connected adjustably by a stud d^9 with an arm C' of the warp-puller, said stud being adapted to be confined in any adjusted position in the slot d^{12} of said arm, so that the extent of rocking motion imparted to the puller may be regulated according to the requirements of the fabric being woven and the quality and strength of the warp-threads, as it will be understood that in weaving different classes of fabric the pull on some of the warps, as hereinafter described, will have to be varied and be more or less.

Referring to Fig. 1, it will be noticed that the warp w , after crossing the whip-roll, is split or divided, one portion, 3, being crossed over the rod C^3 and under the rock-shaft C and being then led into heddles b' of the back harness-frame b and thence through between the dents of the reed, while the other portions, 4³, of the warp-threads, crossed under the rod C^3 and over the rock-shaft C, are led through the eyes of heddles a' in the front harness-frame a .

Figs. 5 to 11 show by diagrams the positions of the warp-puller and shed-forming mechanism during the weaving of cloth on my improved loom, said drawings showing at the left an exaggerated longitudinal section of the fabric and filling. The shots of filling marked 1 to 6, Fig. 5, are represented as contained in the completed fabric, while the shots of filling marked 7 to 12, inclusive, held between the warp-threads, are yet being manipulated by the warp-threads and the reed preparatory to assuming the position of the shots 1 to 6 of the filling. Fig. 5 shows six shots

of filling in position in what may be considered the completed fabric and six other shots of filling as being subject to manipulation by the warps to complete the fabric. In Fig. 5 the warp-puller occupies its inoperative position with the rod C^3 in horizontal line with relation to the shaft C and whip-roll shaft C^x . This figure shows the shed as open and a shot 13 of filling as having been left in the shed by the usual shuttle. (Not shown.) The shuttle was thrown through the open shed while the lay-crank passed about its back center in the direction of the arrows, and after leaving the filling in the shed the lay in its forward movement toward the fell causes the reed in contact with the filling to move the same forwardly toward the previous shot 12 of filling, as in Fig. 6. During this forward movement of the lay the shed is closed, as in Fig. 6, by change of position of the harness-frames and heddles, and as the warp-threads are crossed and while the reed acts against the filling 13 last left in the shed and the lay is yet moving forward into the position Fig. 7 the warp-puller is moved from the position Figs. 5 and 6 into the position Fig. 7, causing the rod C^3 to rise and, acting against those warp-threads 3 which cross over said rod, pull the same backwardly from the points where they are connected in the woven fabric. This movement of the rod C^3 also relieves from strain the warp-threads 4, crossing under it. In this condition of the warp the portion 4 then in the lower plane of the shed at the heddles is held very taut, while the portion 3 in the upper plane of the shed at the heddles is somewhat slackened, and as a result thereof the reed beats the last shot of filling 13 into the fabric and leaves the same, as indicated in Fig. 7, a little below the plane of the previously-laid shot 12 of the filling, which shot 12, as the reed beats in the shot 13, rises from the position Figs. 5 and 6, and the filling-shots 10 and 8 also rise while the shots 11 and 9 fall, and the shot 7 assumes its position at the level of the shots 1 to 6. After having been moved forwardly, as shown in Fig. 7, the lay is started on its back stroke, as in Fig. 8, the shed is further crossed, and the warp-puller is again put in its inoperative position, the warp-threads being at such time subjected to only the strain of the heddles. Fig. 9 shows the next shed fully opened, the lay on its back stroke, and another shot 14 of filling is thrown into the shed. After this the lay continues its forward movement, as shown in Fig. 10, and the shed is closed, which done, the warps are crossed, as in Fig. 11, the warp-puller is moved into its other extreme position, lowering the rod C^3 as the lay continues in its forward movement. The lowering of the rod C^3 pulls on the threads 4, drawing them backwardly across the rod C, while the threads 3 are held slack. In this condition the reed is made to lay the shot 14

of filling somewhat under the previous shot 13, said shot 13 and shots 11 and 9, Figs. 9 and 10, also rising, while the shots 10 and 12 descend, the shot 8 arranging itself in line with the other shots 1 to 7, which, with shot 8, are at their shed seated firmly and solidly into the warps. In this way it will be understood, as herein illustrated, that one half of the warp is pulled backwardly from the point where the last filling is laid, while the tension on the other half of the warp is somewhat relaxed as the lay moves forward to beat into the cloth the filling laid in the last shed to be crossed on said filling, and at the next forward beat of the lay after laying another filling in the shed the part of the warp that was pulled back at the previous forward movement of the lay is released from tension, while the part of the warp which was relieved from tension at the previous beat of the lay is pulled back. The warp-puller acts on the warp in a sort of seesaw motion, pulling half of the warp backwardly at one forward beat of the lay and the other half backwardly at the next forward beat of the lay. This motion of the warps, which I have for the lack of a better term designated as a "seesaw" motion, results in so working the warp that at times a portion is pulled back while another portion is loosened, and this operation is continued throughout several beats of the lay on several successive shots of filling, and I find that the filling so laid into the fabric is incorporated more firmly than if the warps were subjected to the same tension when the lay beats the filling into the shed, and the fabric is made more solid and compact and without any chance to grin or show spaces through the same. This is a matter of very considerable importance in the weaving of all fabrics, both heavy woolen cloth and duck, and also on thin fabrics, as silk.

In my invention it will be noticed that the warp-puller is not devised merely to slacken one part of the warp to pull back on some of the warps.

I believe I am the first to devise apparatus to pull part of the warp backwardly and hold such part of the warp under a much greater degree of tension than the other part of the warp, said tension being more than is customary in weaving the same class of fabrics in ways now practiced, and it will also be observed that the rod C^3 acts alternately on one and then on another part of the warp-threads to pull the same backwardly, as stated, thus bending the pulled warps more and more between the rock-shaft and the shaft of the whip-roll or device sustaining the warps after leaving the warp-beam.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a loom, a lay, actuating mechanism therefor, and shed-forming mechanism, a

warp-puller, means connected to the lay-actuating mechanism for moving said warp-puller from its inoperative position into its active position while the lay is at its forward position, and for again moving it to its inoperative position as the lay moves to its rearward position.

2. In a loom, a lay, actuating mechanism therefor, including a cam-shaft, a cam on said shaft, a lever having a forked end embracing said cam, a stand on which said lever is pivoted, a warp-puller, and connections between said warp-puller and said lever whereby the warp-puller is actuated from the cam-shaft and moved from its inoperative to its operative position while the lay is at the forward position.

3. In a loom, a lay, actuating mechanism

therefor, including a cam-shaft, a cam having a toe and recess and mounted on said shaft, a stand secured to the loom-frame, a lever pivoted on said stand and having a bifurcated end embracing said cam, a link connecting the said bifurcated portions, a warp-puller, and means connecting said puller to said lever, whereby a quick movement of the warp-puller is secured under the actuation of the toe and recess of the cam.

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

ANKER PETERSEN.

Witnesses:

GEO. W. GREGORY,
EDITH M. STODDARD.