

No. 613,808.

Patented Nov. 8, 1898.

D. F. SULLIVAN.
KNITTING MACHINE.

(Application filed Oct. 5, 1897.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

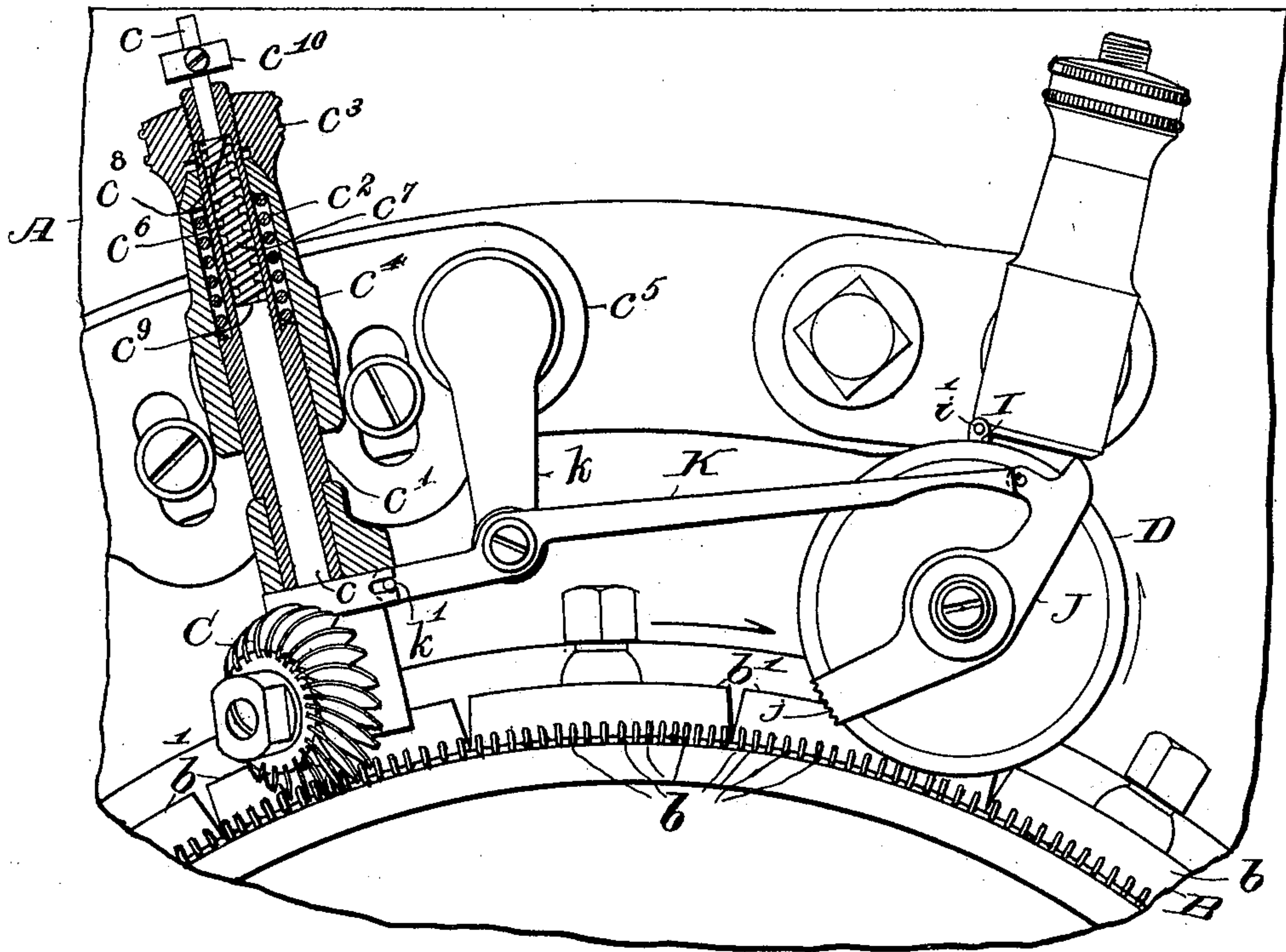


Fig. 2.

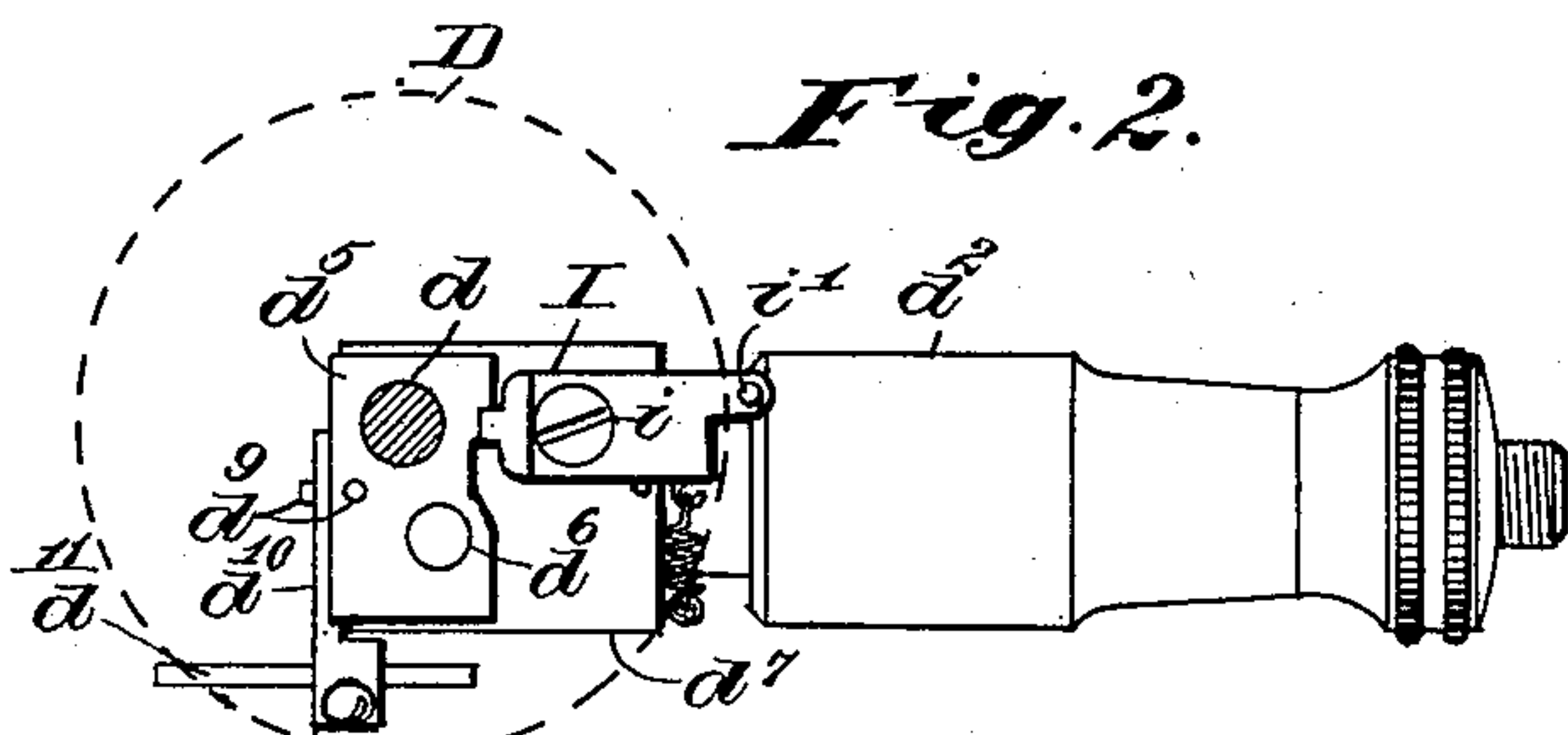


Fig. 3.

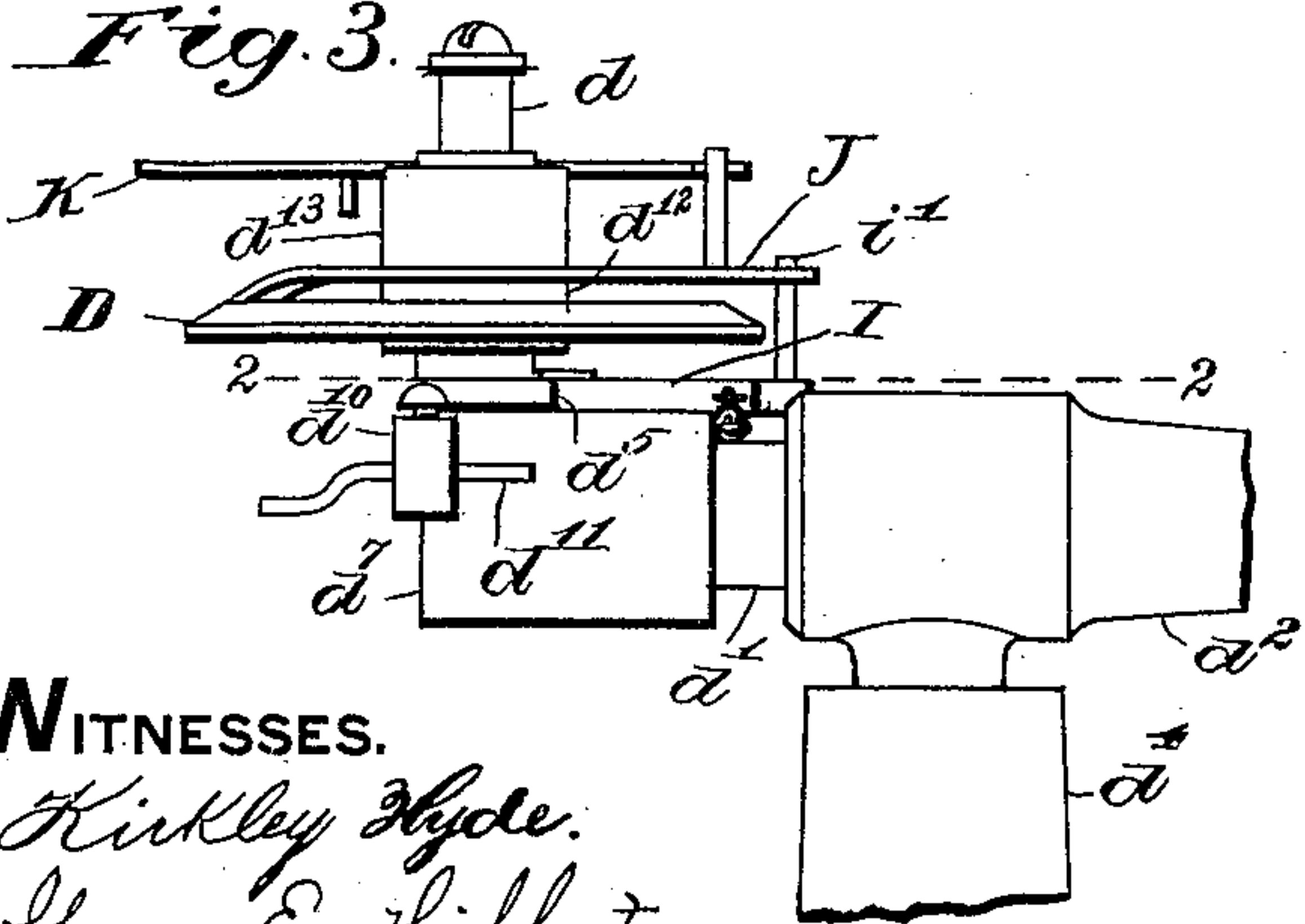
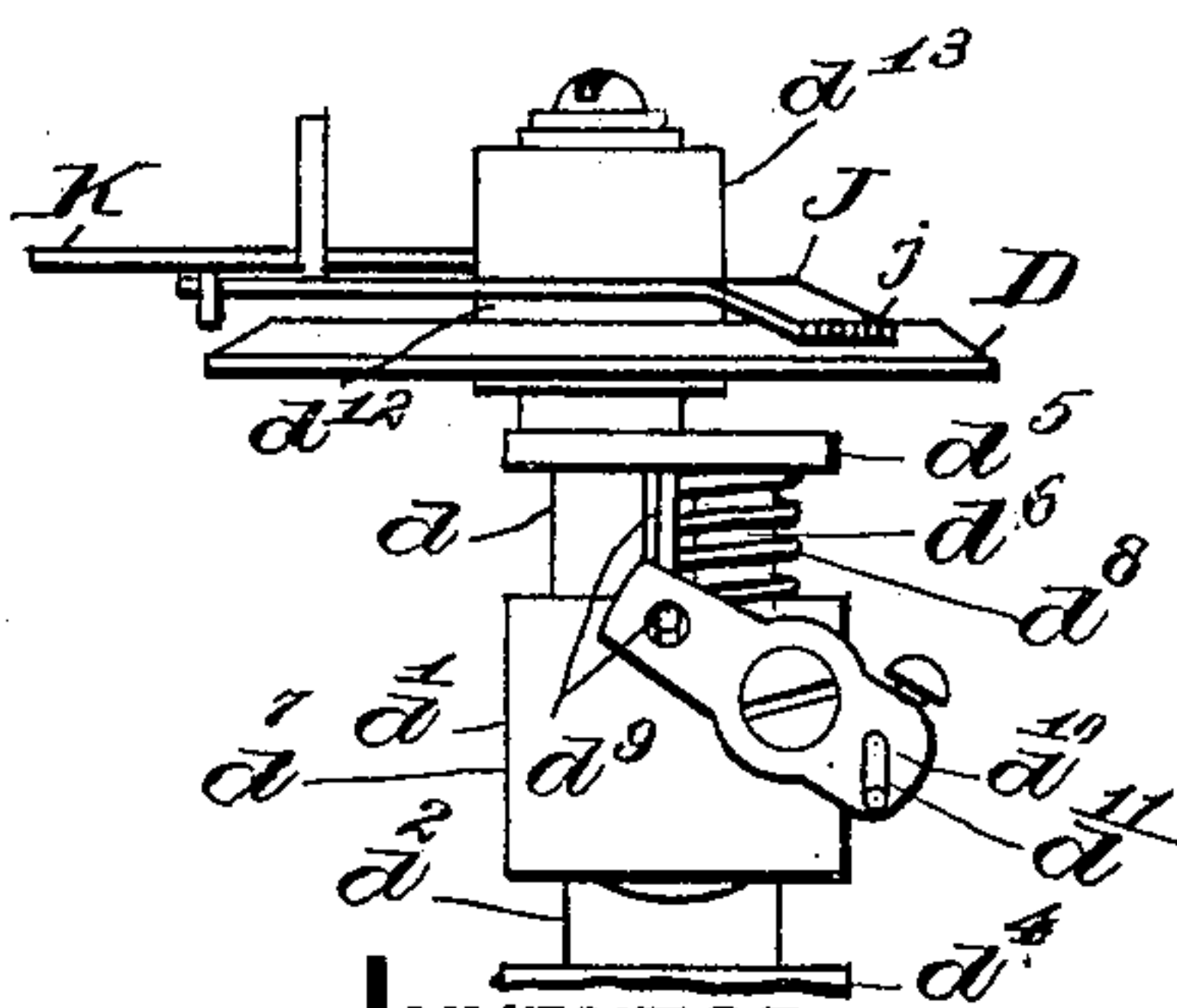


Fig. 4.



WITNESSES.

Kirkley Hyde.
Grace E. Hibbert.

INVENTOR

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By Albert M. Moore,
His ATTORNEY.

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2 Sheets—Sheet 2.

Fig. 5.

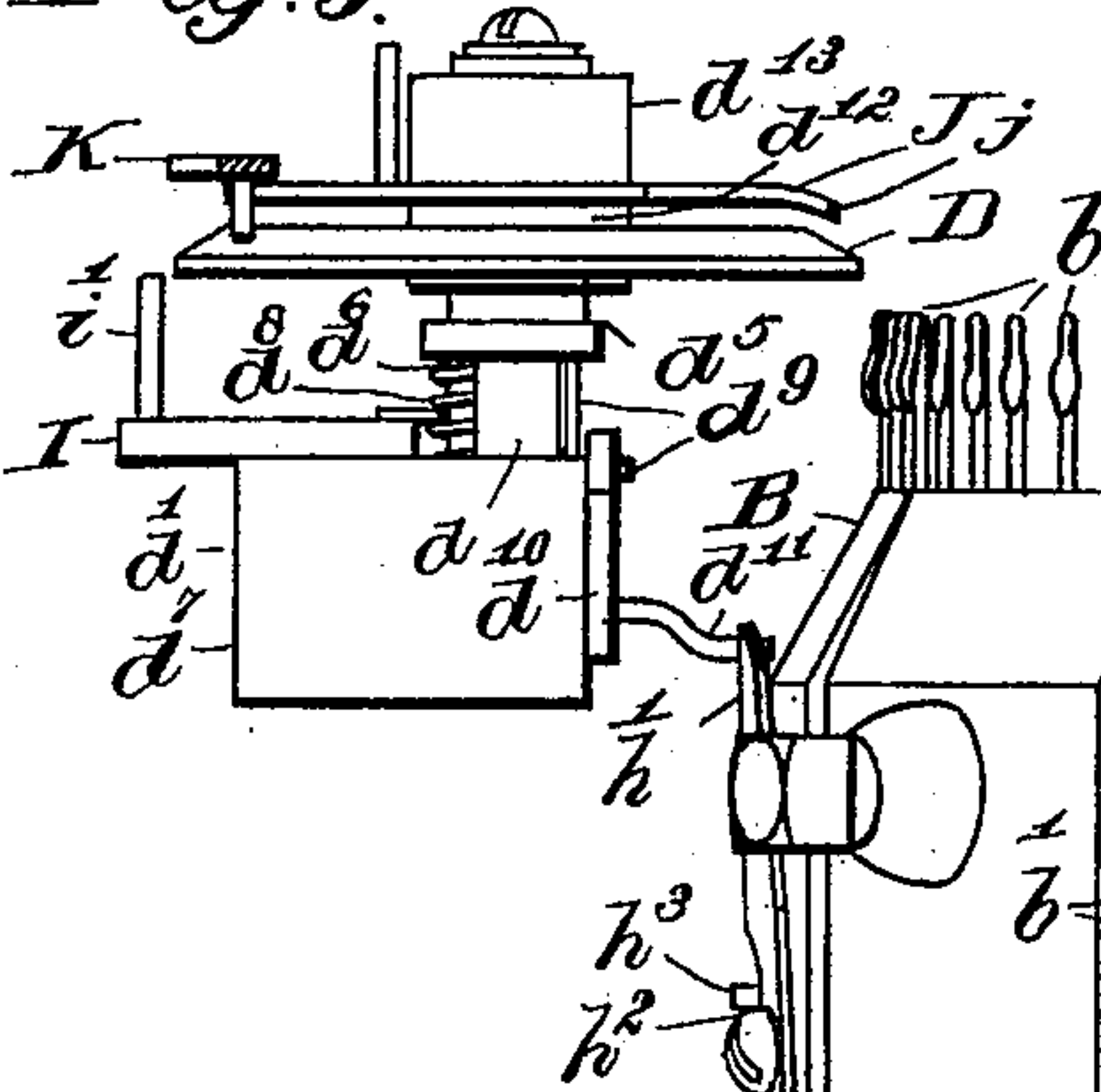


Fig. 6.

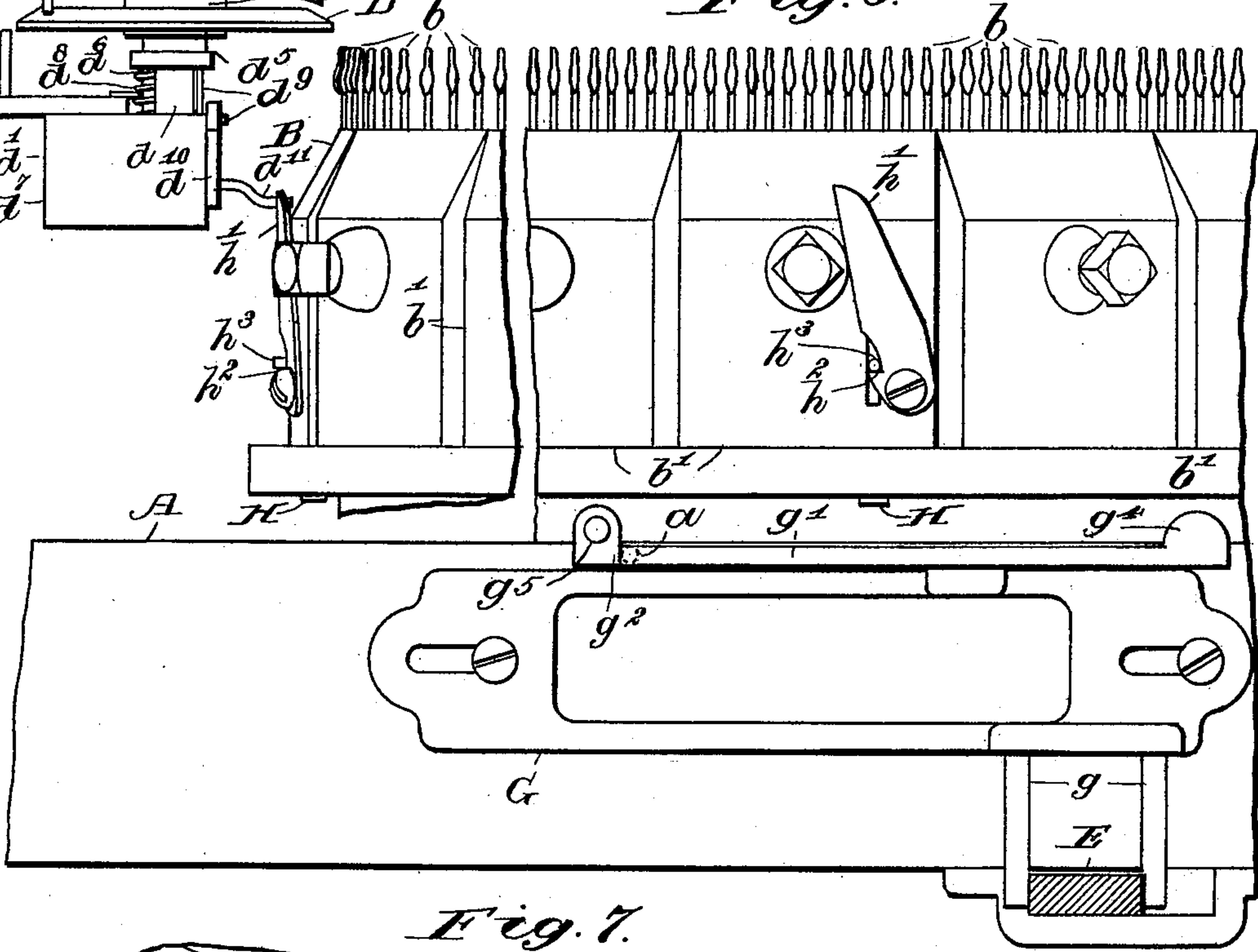


Fig. 7.

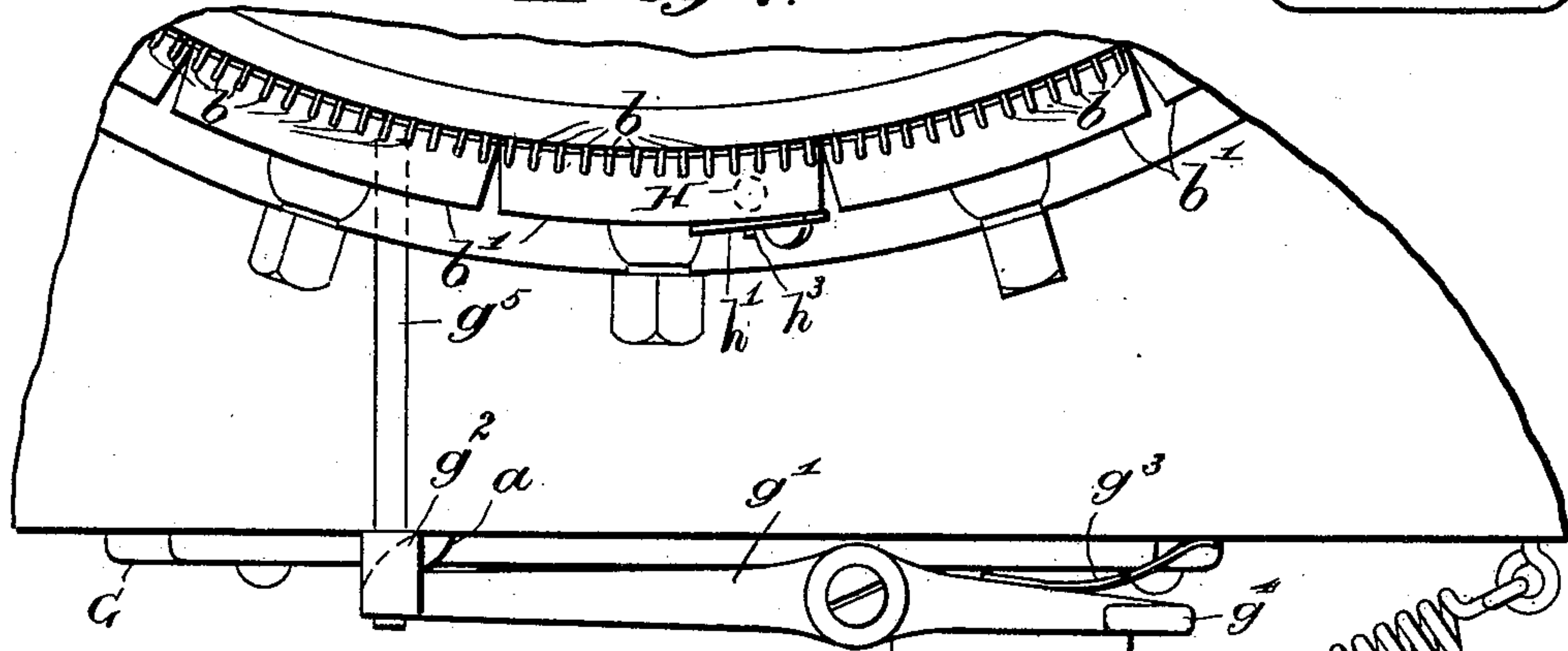
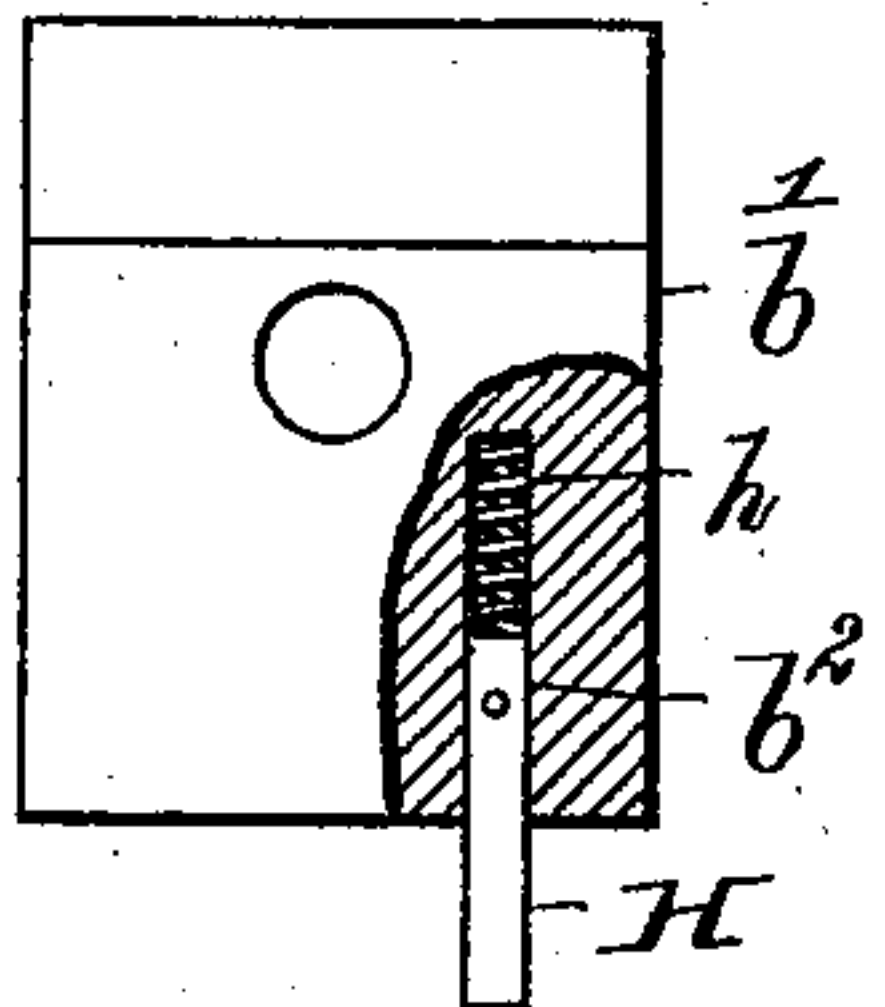


Fig. 8.



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UNITED STATES PATENT OFFICE.

DANIEL F. SULLIVAN, OF LOWELL, MASSACHUSETTS.

KNITTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 613,808, dated November 8, 1898.

Application filed October 5, 1897. Serial No. 654,116. (No model.)

To all whom it may concern:

Be it known that I, DANIEL F. SULLIVAN, a citizen of the United States, residing at Lowell, in the county of Middlesex and Commonwealth of Massachusetts, have invented a certain new and useful Improvement in Circular Spring-Needle Knitting-Machines, of which the following is a specification.

My invention relates to circular spring-needle knitting-machines; and it consists in the devices and combinations hereinafter described and claimed.

The general object of this invention is to give the dividing-wheel a yielding pressure toward the needles in such a manner that when there is a yarn between said wheel and needles said wheel will be held in its proper operative position; but upon a failure of said yarn said wheel and its spindle will move nearer to said needles and by connecting mechanism release other automatic devices which throw the presser-wheel out of operation and in turn release the devices which operate the shipper-lever to stop the machine.

In the accompanying drawings, on two sheets, Figure 1 is a plan showing a part of a head of a circular spring-needle knitting-machine, the dividing-wheel, the presser-wheel, the latch-lever, the locking and unlocking levers, and their supporting devices, the bracket and outer spindle of the dividing-wheel being in horizontal longitudinal section; Fig. 2, a horizontal section on the line 2 2 in Fig. 3; Fig. 3, a side elevation, looking from the right in Fig. 1, of the presser-wheel and a part of its stand, the parts supported by said stand, and the latch; Fig. 4, an inside elevation of the parts shown in Fig. 3; Fig. 5, a left side elevation of the parts shown in Figs. 2, 3, and 4, also of a part of the head and its latch, the presser-wheel being raised; Fig. 6, an elevation of a part of the head, part of the table, and the parts of the stop-motion supported by said head and table, the shipper-lever being in vertical cross-section; Fig. 7, a plan of the parts shown in Fig. 6; and Fig. 8, an outside elevation of a needle-clamp, partly in vertical section, to show the shipper-bolt and its spring.

The table A, head B or needle-cylinder,

needles *b*, needle-clamps *b'*, dividing-wheel C, and presser-wheel D are all of the usual construction, except as hereinafter stated, and are used with other parts, (not shown, but commonly employed in circular spring-needle knitting-machines,) including a loop-wheel or stitch-wheel, a push-back, and a landing-wheel, all of any usual construction and operation.

The head B is rotated in any usual manner and substantially as shown in the United States Patent to myself and Edward F. Staples, No. 490,758, dated January 31, 1893, where a bevel-gear is secured to the head concentrically therewith and is driven by another bevel-gear which turns with a constantly-rotating horizontal drive-shaft, but may be disengaged from the first-named gear by a shipper-lever which is normally drawn by the contraction of a spring to effect such disengagement by sliding said second-named gear on said shaft. I use this shipper-lever E and spring F, which are shown in Figs. 6 and 7 of the drawings filed herewith.

When the shipper-lever E is in the position shown in Fig. 6, the machine is in operation. A slide G, having a fork or pins *g*, is movable on the table A and supports a lever *g'*, one arm of which is provided with an enlargement *g*², which by catching over a horizontal stud *a*, which projects from the table A, prevents the slide G from being moved by the action of the spring F on the shipper-lever E. The engagement of the enlargement *g*² and the stud *a* is maintained by a spring *g*³, which forces the arm of the lever *g'* farthest from said stud outward; but by pressing against the enlargement or thumb-piece *g*⁴ and compressing said spring *g*³ such engagement is broken and the shipper-lever is drawn by the spring F to uncouple the gears and to allow the machine to stop. In the enlargement *g*² is secured an extension or rod *g*⁵, which projects toward the head and is adapted to be struck by a bolt H, Figs. 5, 6, 7, and 8, when said bolt is in its lowest position, said bolt sliding in a vertical hole *b*² in a needle-clamp *b'* and when released being forced downward by a spring *h*, but normally held up by a catch *h'*, pivoted on said needle-cylinder. 100

dle-clamp and having a shoulder h^2 , which reaches under a pin h^3 , which projects from said bolt. When the free upper end of the catch h' strikes against any obstruction, the catch is turned on its pivot and releases the bolt H, which strikes the rod g^5 , turns the lever g' , and disengages the enlargement g^2 from the stud a .

The catch h' and shipper-lever E and the parts which are between said catch and shipper-lever I do not herein claim as new.

The presser-wheel or presser D turns upon a stud d , secured in the spindle d' , said spindle being supported in the usual manner by the bracket d^2 and stand d^4 . The presser-wheel rests upon a plate d^5 , having a nearly vertical stem d^6 , adapted to slide in a hole in the block d^7 , which forms the head of the spindle d' , and a spring d^8 tends to throw said plate d^5 upward, and thereby to raise said presser-wheel above the needles b . A hook or link d^9 connects said plate d^5 and one end of a lever d^{10} , pivoted on said block or spindle-head d^7 and carrying at its other end a finger d^{11} , which projects in the path of the upper end of the catch h' when the presser-wheel is raised by the spring d^8 and rocks said lever d^{10} and moves said catch to release the spring-bolt H above described. The plate d^5 is normally held down by a catch or locking-lever I in such a manner as to allow the presser-wheel D to keep in engagement with the needles and to hold the finger d^{11} out of the path of the catch h' .

The locking-lever I herein shown and described is disengaged from the plate d^5 by means of the unlocking-lever J, said locking-lever turning on a vertical fulcrum i on the block d^7 and having an upwardly-projecting stud i' , which stands in the path of said unlocking-lever when the presser-wheel is in operative position, and said unlocking-lever turning loosely on the hub d^{12} of the presser-wheel and being retained thereon by a collar d^{13} and being adapted to be rotated by frictional contact therewith.

One end of the unlocking-lever J is notched or serrated at j to engage with the needles when said end j is brought into position to be caught by said needles, and the other end of said lever J is adapted to be engaged by one end of the latch-lever K and prevented from being turned (by friction on the presser-wheel) when the dividing-wheel C is in the position it occupies in the usual operation of the machine, said latch-lever K being fulcrumed on a suitable stand k , supported on the table A, and its end farthest from the unlocking-lever J being pivoted at k' to the inner spindle c , Fig. 1, of said dividing-wheel C.

The outer spindle c' of the dividing-wheel aside from being hollow is of the usual construction, being forced toward the needles b by a stout spring c^2 and being adjusted by a nut c^3 , which turns on said outer spindle c'

against the outer end of the sleeve-bracket c^4 , the latter being supported in a stand c^5 , all in the usual manner, except as above stated.

The inner spindle c slides in the axial hollow c^6 of the outer spindle c' and is pushed toward the needles b by a spring c^7 , similar to but much weaker than the spiral spring c^2 , the latter being used to render the outer spindle substantially unyielding in the operation of the machine, while the spring c^7 is intended to allow the inner spindle to yield outward to the pressure of the yarn between the dividing-wheel and the needles and to throw the leaves of said wheel farther into the needles when said yarn breaks.

The spring c^7 is compressed between the contracted end c^8 of the hollow of the outer spindle c' and a shoulder c^9 on the inner spindle, and the motion of said inner spindle toward the needles is limited by an adjustable collar c^{10} on the outer end of said inner spindle c striking against the outer end of the outer spindle c' , Fig. 1.

When the yarn breaks and the dividing-wheel C sinks deeper into the needles b , the latch-lever K releases the unlocking-lever J and the presser-wheel is raised and the machine stopped by the means above described.

I claim as my invention—

1. The combination with the head and needles, of a stand, a bracket supported by said stand, a hollow outer spindle, adjustable in said bracket, an inner spindle arranged to slide in the hollow of said outer spindle and provided with a stud, a dividing-wheel adapted to turn on said stud, and a spring, adapted to press said inner spindle out of said outer spindle, toward said needles.

2. The combination with the head and needles, a spindle, a support, in which said spindle is adapted to slide longitudinally in either direction, a dividing-wheel, supported thereby, a spring, adapted to press said spindle toward said needles and to be resisted by the yarn in said needles, the presser-wheel, a plate, on which said presser-wheel rests, a spring, adapted to raise said plate and lift said presser-wheel above said needles, a catch, adapted to hold said plate down against the resistance of said spring, an unlocking-lever, having an end adapted to engage said needles and another end adapted to disengage said catch from said plate, and a latch, normally engaging said unlocking-lever and preventing the movement of the same, and connecting means between said latch and spindle, whereby said latch is adapted to be moved by said spindle out of engagement with said unlocking-lever.

3. The combination with the head and needles, a dividing-wheel, a spring, adapted to press said wheel toward said needles and to be resisted by the yarn in said needles, the shipper-lever, another spring, to operate said shipper-lever when released to stop said head,

locking means for said shipper-lever, and intermediate mechanism connecting said locking means and said dividing-wheel, whereby said shipper-lever may be released by the
5 movement of said dividing-wheel toward said needles.

In witness whereof I have signed this speci-

fication, in the presence of two attesting witnesses, this 28th day of September, A. D. 1897.

DANIEL F. SULLIVAN.

Witnesses:

ALBERT M. MOORE,
GRACE E. HIBBERT.