

(No Model.)

2 Sheets—Sheet 1.

J. M. CHATFIELD.
WINDING DRUM.

No. 436,824.

Patented Sept. 23, 1890.

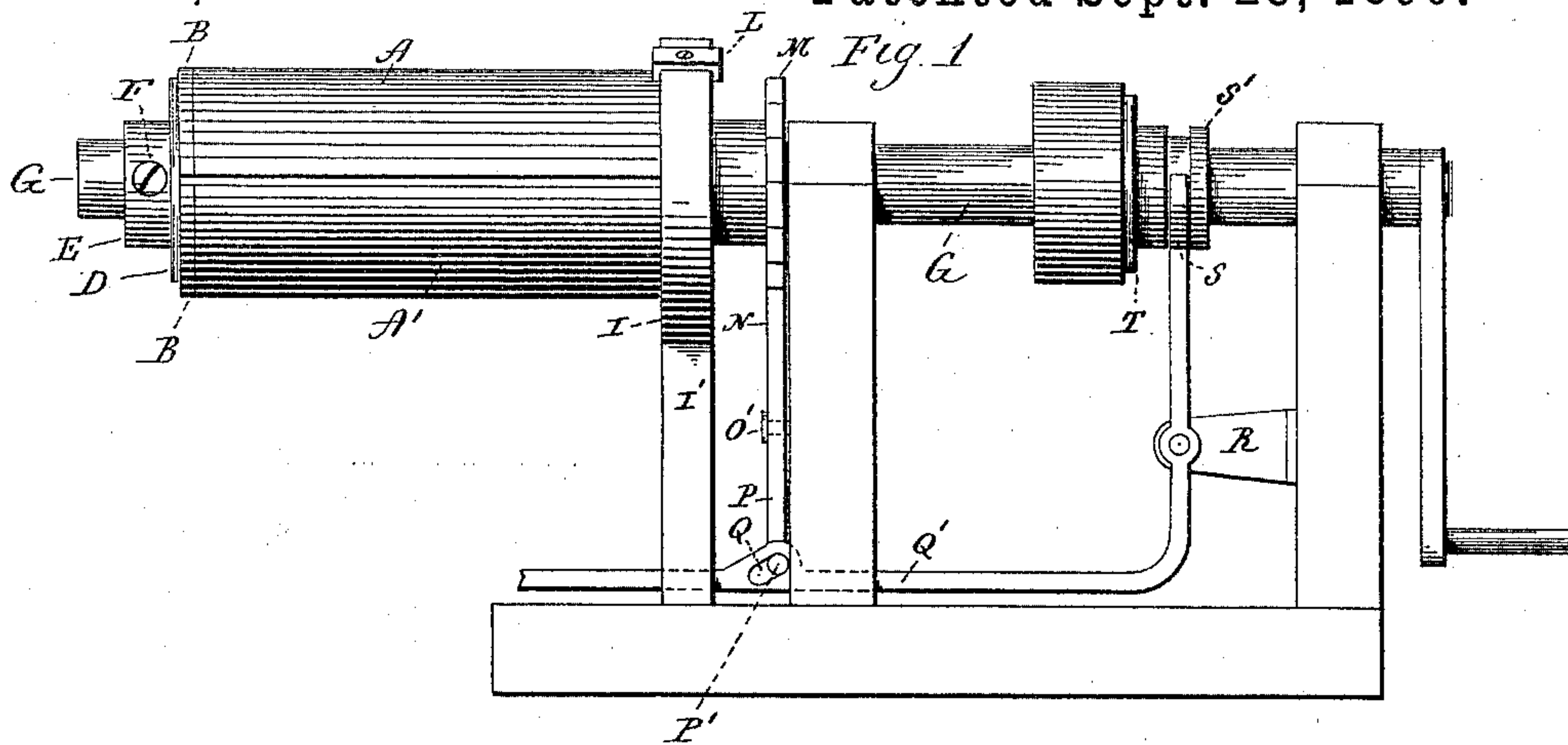


Fig. 6

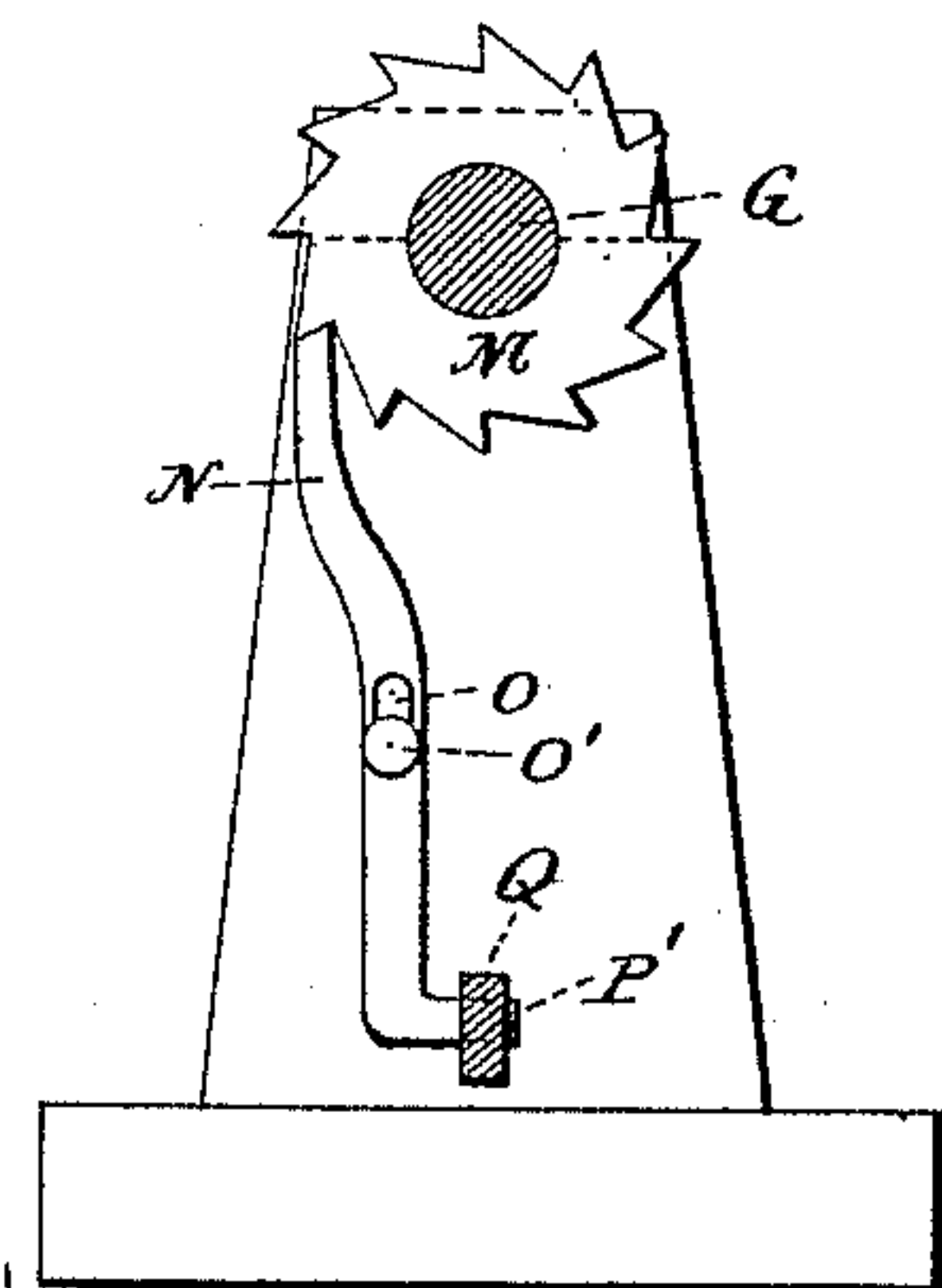


Fig. 2

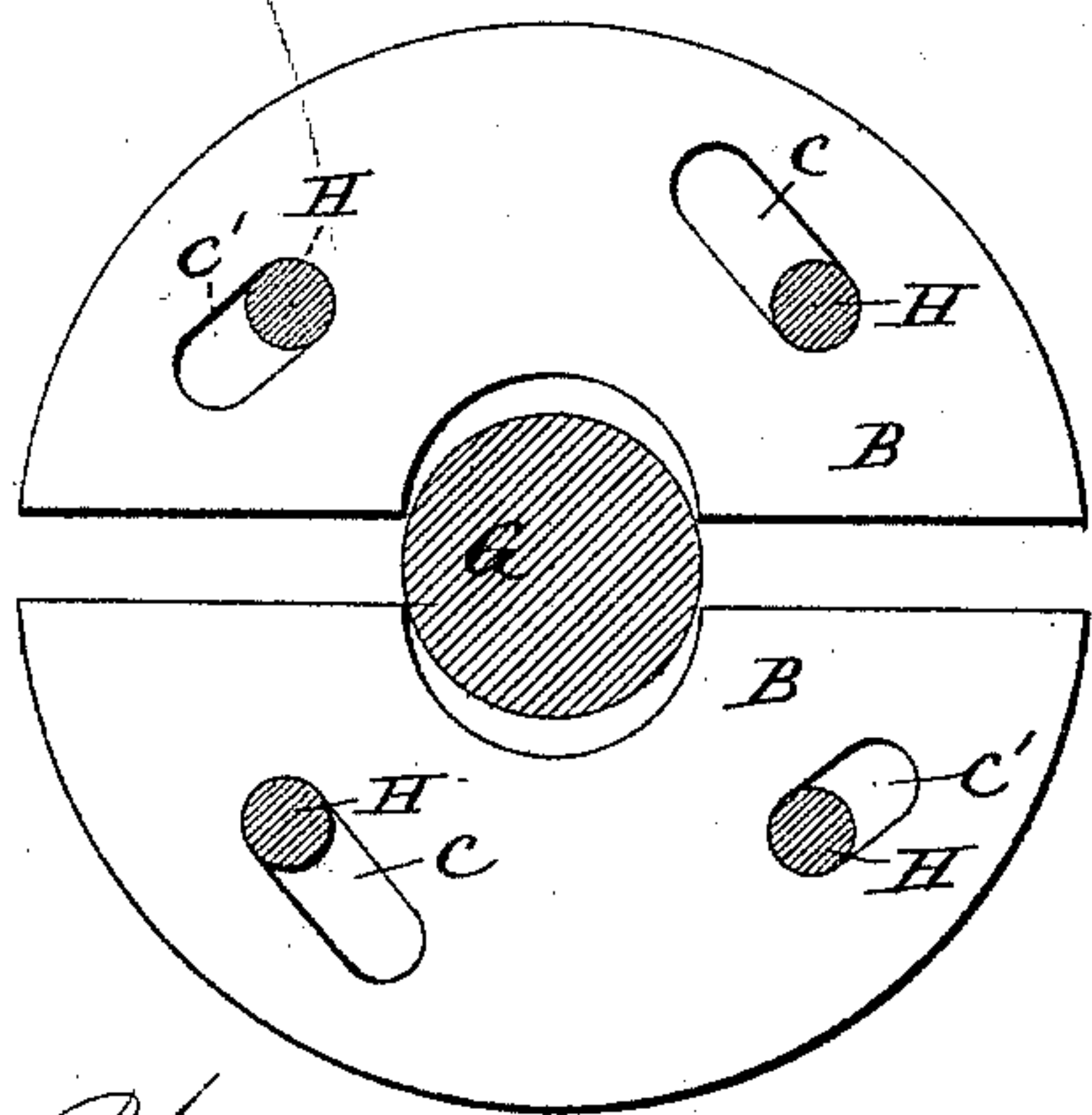


Fig. 5

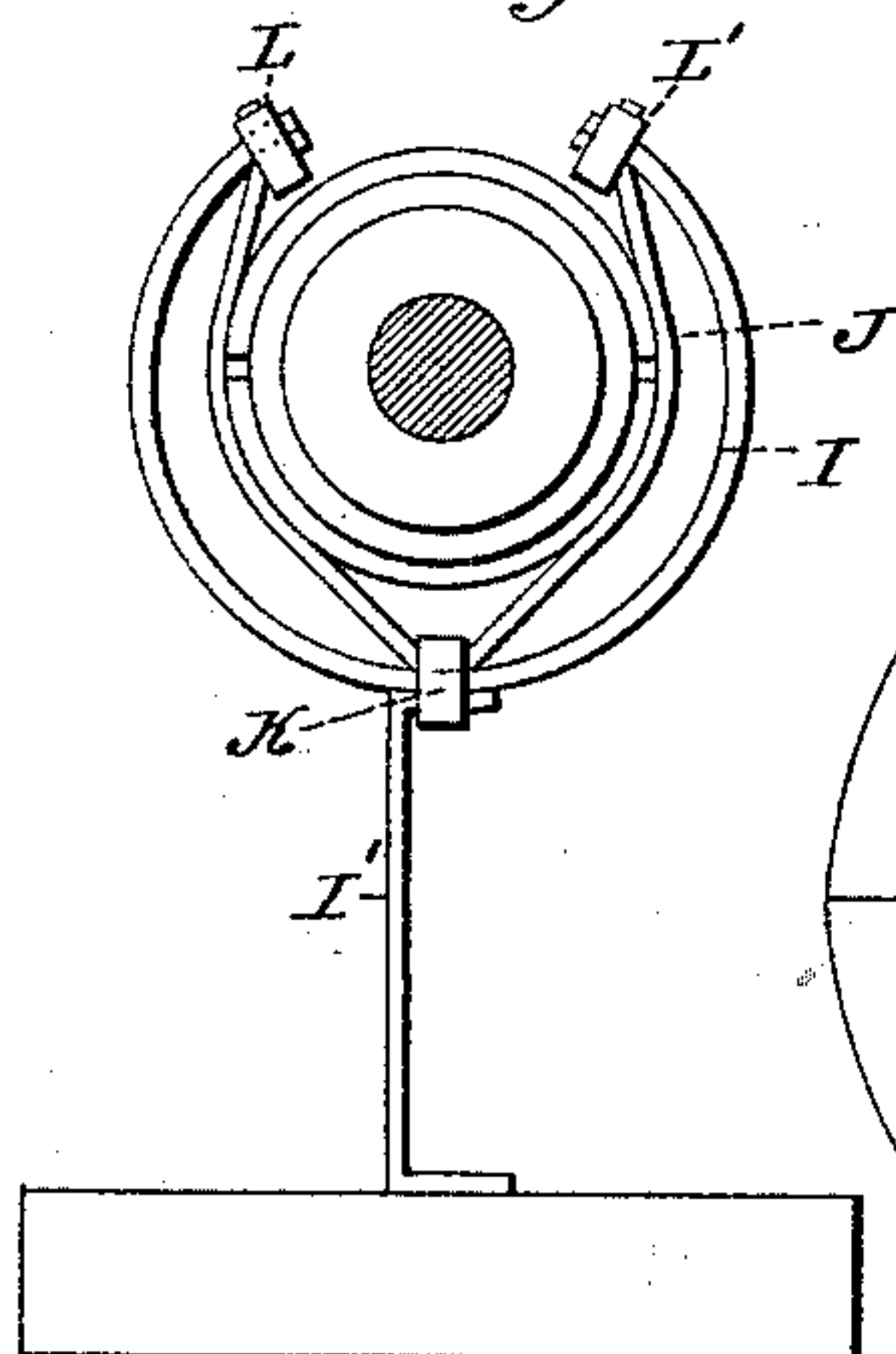


Fig. 4

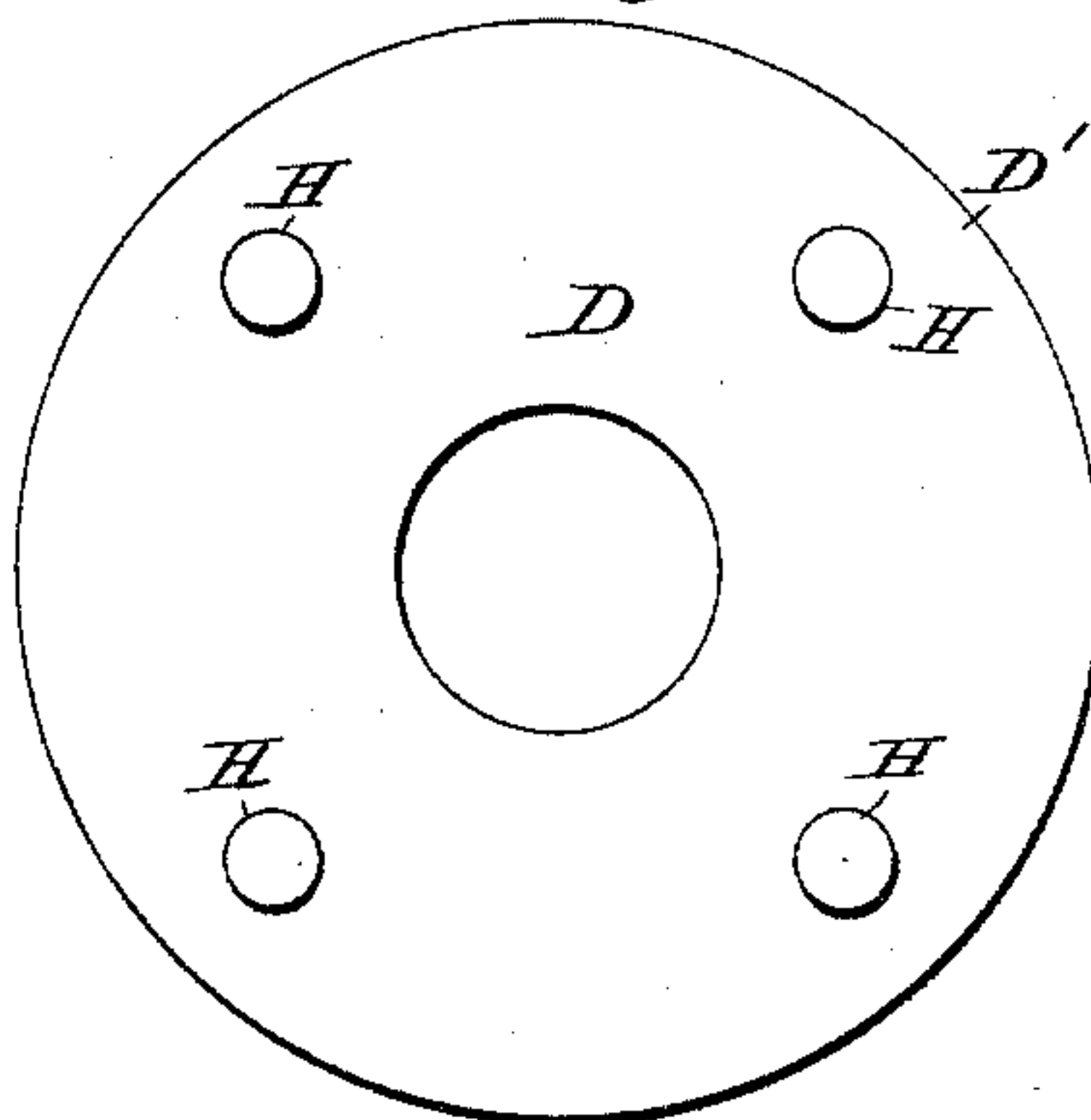
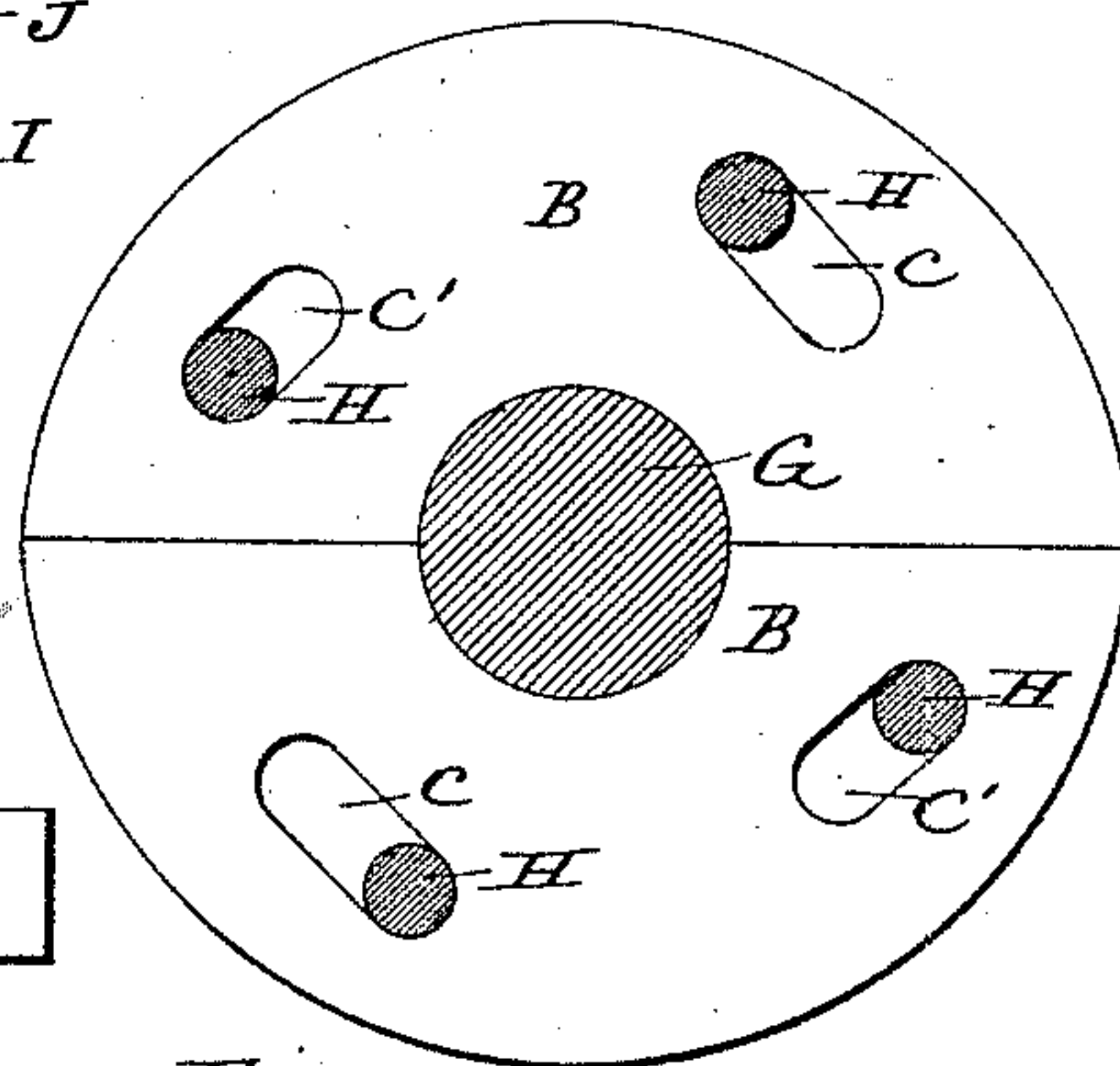


Fig. 3



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Carle Seymour

(No Model.)

2 Sheets—Sheet 2.

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Fig. 7

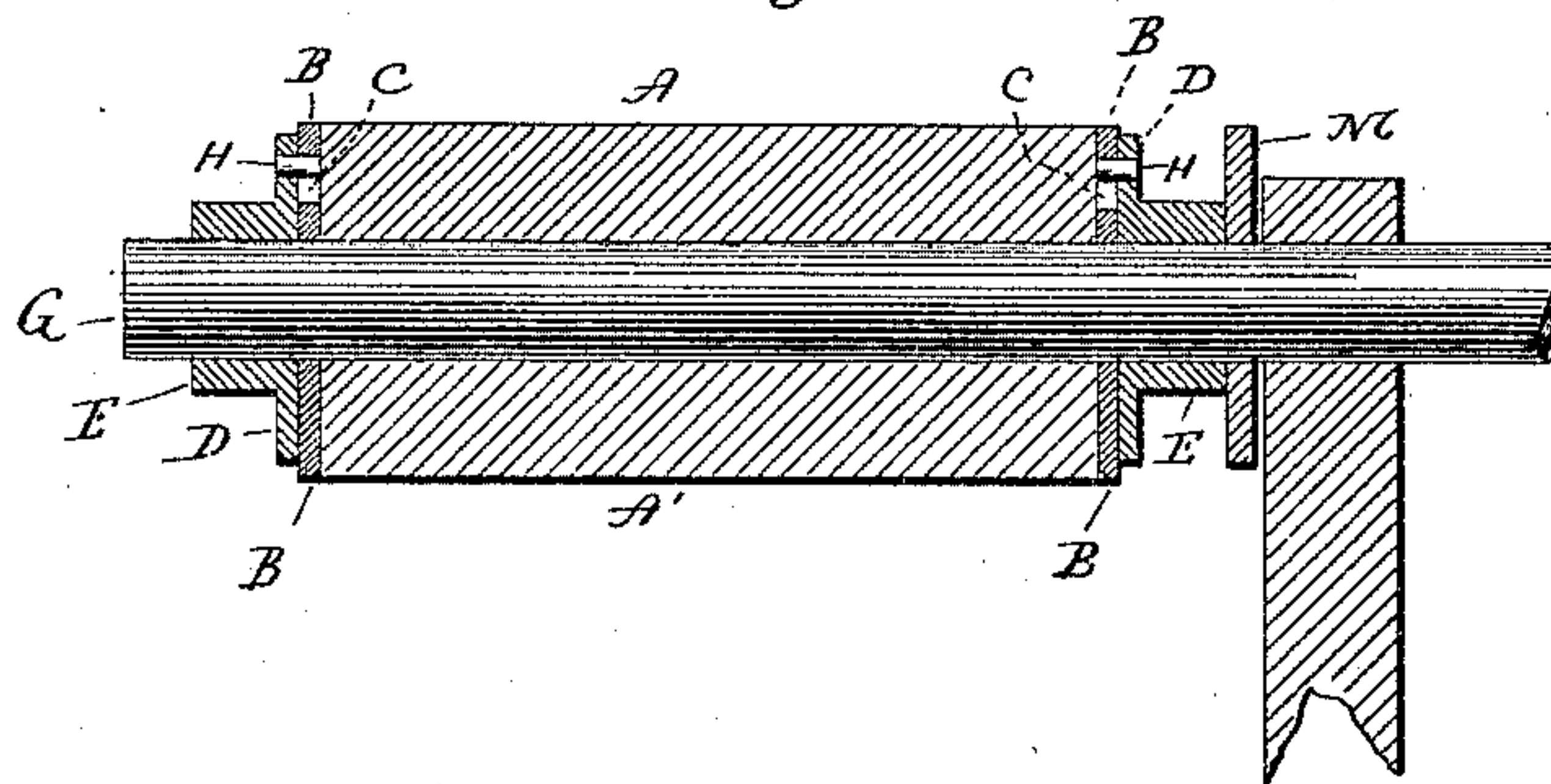


Fig. 8

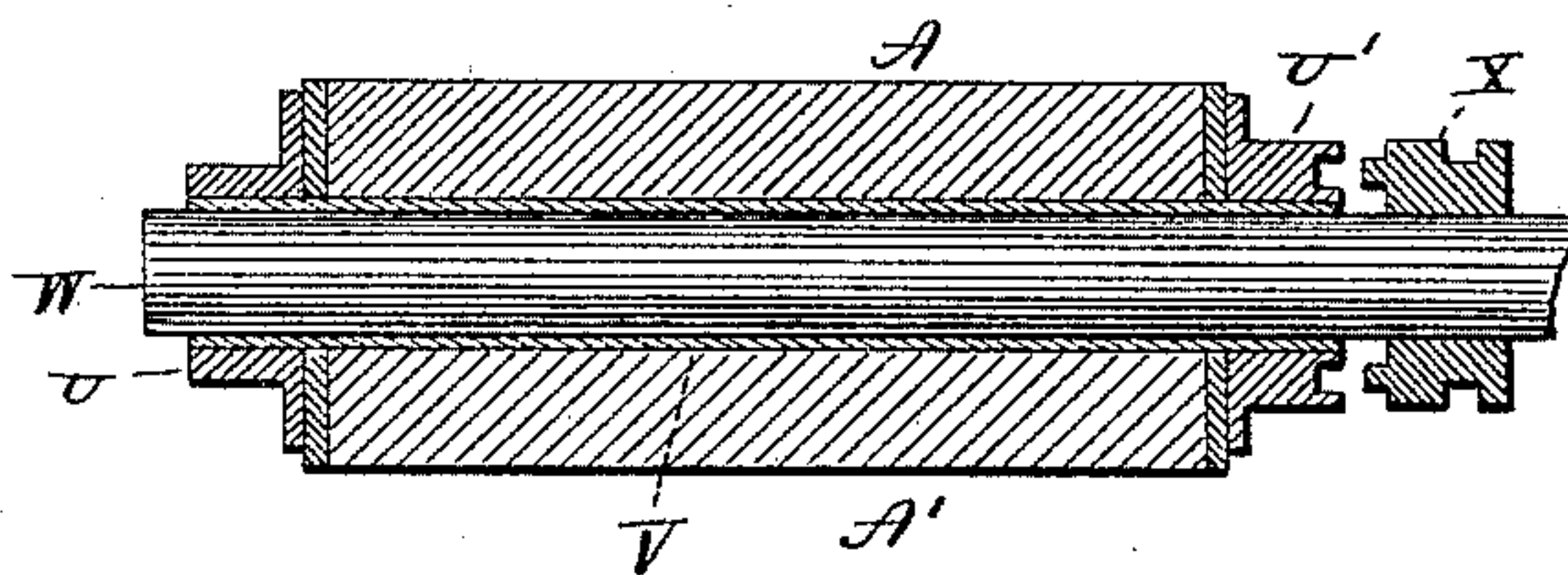
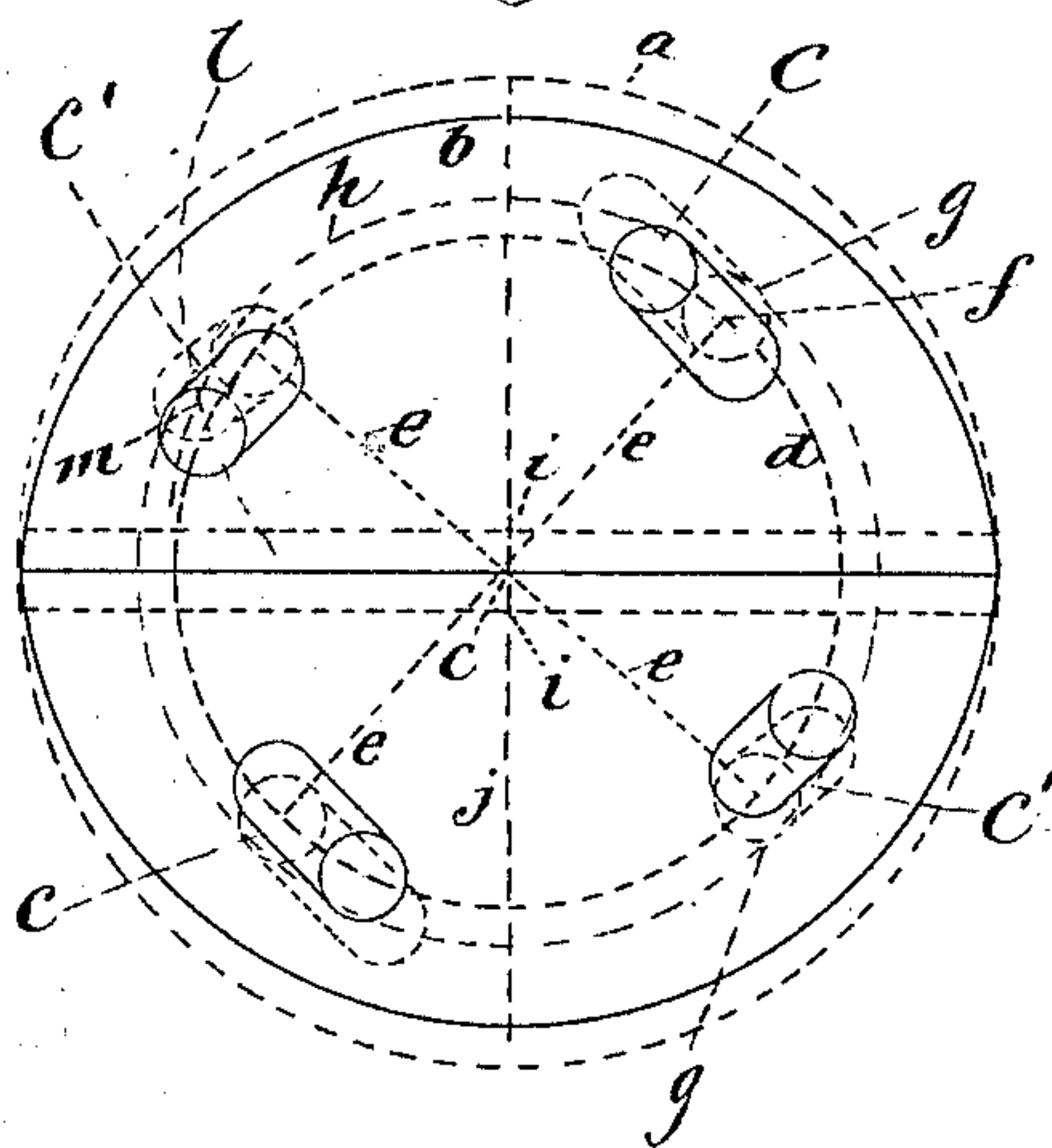


Fig. 9



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UNITED STATES PATENT OFFICE.

JAMES M. CHATFIELD, OF THOMASTON, CONNECTICUT.

WINDING-DRUM.

SPECIFICATION forming part of Letters Patent No. 436,824, dated September 23, 1890.

Application filed April 4, 1890. Serial No. 346,556. (No model.)

To all whom it may concern:

Be it known that I, JAMES M. CHATFIELD, of Thomaston, in the county of Litchfield and State of Connecticut, have invented new Improvements in Winding-Drums; and I do hereby declare the following, when taken in connection with accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a view in side elevation of one form which a drum embodying my invention may assume, together with automatic operating connections; Fig. 2, an enlarged view of the drum, in end elevation, showing its sections in their separated positions and the operating-pins of the shaft-head in section; Fig. 3, a similar view with the sections of the drum in their closed or contracted positions; Fig. 4, a detached view, in inside elevation, of one of the shaft-heads; Fig. 5, a view drawn to the scale of Fig. 1, and showing the drum in end elevation from its inner end with particular reference to a friction device for automatically expanding the drum; Fig. 6, a view in transverse section showing the pawl-and-ratchet device for suddenly stopping the drum and automatically contracting its sections; Fig. 7, a view of the drum in vertical longitudinal section drawn to the scale of Fig. 1; Fig. 8, a modified construction which the drum may assume; Fig. 9, a diagram showing one mode of plotting the slots in the plates attached to the ends of the drum-sections.

My invention relates to an improvement in winding-drums, the object being to adapt them to be contracted to relieve the material wound upon them, and thus permit it to be readily removed.

Further objects of my invention are to produce a drum of the character described, which shall be simple, strong, and durable, and consist of few parts, and be automatic both in its expanding and contracting action.

With these ends in view my invention consists in a winding-drum made in two or more longitudinal sections, a shaft, and connections between the sections and shaft arranged on the basis of two circles differing in diameter by the distance representing the radial play of the sections.

My invention further consists in certain details of construction and combinations of parts, as will be hereinafter described, and pointed out in the claims.

As herein shown, the drum is composed of two horizontal drum-sections A and A', each a little less than a true semicircle in transverse section. Each end of these sections has rigidly secured to it a metallic plate B, exactly corresponding to it in transverse section and provided with two slots C and C', respectively, of different length and pitch. The two plates B B at each end of the drum will therefore present, in all, four slots, the length, pitch, and arrangement whereof will be considered at another time.

Two disk-shaped shaft-heads D and D', each having an outwardly-projecting hub E, carrying a set-screw F, by which it is secured to the shaft G, are respectively located at the opposite ends of the drum-sections. Each of these heads is provided with four inwardly-projecting pins H, arranged at the four corners of a square and entering the four slots presented to them in the two adjacent plates of the drum-sections. It will be noted that each end of each section has two connections with the shaft, respectively, arranged on the basis of two circles of different diameter, and that the connections operate at a right angle to the shaft. The said pins communicate the motion of the shaft to the drum-sections and also hold the same in place through the said plates, which, with the pins, compose the connections between the shaft and drum-sections. The pitch, length, and relative arrangement of the said slots determine the radial play to be ascribed to the drum-sections, and that factor is employed in the construction of two circles in which the slots are plotted.

One way of plotting the slots is shown by the diagram forming Fig. 9 of the drawings. In that drawing the outer circle *a*, in broken lines, represents the circumference of the drum when the sections thereof are expanded, the inner circle *b*, in full lines, the circumference of the drum when the sections thereof are contracted, and the point *c* the center of the shaft. Taking the point *c* as a center, the circle *d* is struck, the said circle corresponding exactly in size to a circle which, if

placed upon either of the shaft-heads, would pass through the center of each of its pins H. This circle d is then quartered by two diametrical lines $e e$, located at a right angle to each other, the points f , where the lines $e e$ intersect the circle d , locating the centers of the inner ends of the four slots. In the expanded positions of the drum-sections the pins will be located at the said ends of the slots, as shown by the small dotted circles g on the diagram. The circle h is now struck and made larger than the circle d by the length of the line, which represents the extreme radial play of the sections. As shown by the drawings, this distance is represented by the distance between the points $i i'$ on the line j . The centers of the outer ends of the slots C C fall in the circle h , and at points therein not strictly arbitrary, but determined in a measure by the pitch found to afford the best results and easiest operation in practice. The centers of the outer ends of the slots C C having been established, they are employed in locating the centers of the forward ends of the slots C' C'. The pins H being stationary with reference to each other, it is apparent that when the shaft-head is rotated to throw the pins entered into the slots C C from the inner to the forward ends thereof the pins in the slots C' C' will be moved the same distance forward. The distance between two adjacent pins, measured off from the centers of the forward ends of the slots C C, will therefore give one line for determining the positions of the centers of the forward ends of the slots C' C'. With compasses set to the distance between two adjacent pins, one leg is placed in the center of the forward end of one of the slots C and the other end swept across the circles d and h , securing the line l . The centers of the inner ends of all of the slots were located, as has been explained, in the circle d , which was struck from the point C, representing the center of the shaft; but when the pins are in the outer ends of the slots the drum-sections are contracted and the points $i i'$ are brought together and to the point C. With compasses set to the radius of the circle d , one leg is therefore placed on the point i and the other swept across the line l , and the point m , where they intersect, will locate the center of the outer end of the slot C' of the drum-section A, the center of the forward end of the slot C' of the drum-section A' being determined from the point i' .

Under the described construction the two drum-sections will be held in position by the pins H and the shaft permitted to rotate independently of them within the limits of the slots. When, however, the shaft is rotated in the direction of winding and the drum-sections are retarded, either mechanically or by centrifugal action, the pins will seek the inner ends of the slots, which, being the nearest to the shaft, permit the drum-sections to separate and reach the limit of their outward

radial movement, in which they are retained as long as the pins remain in the inner ends of the slots, from which direct radial pressure will not dislodge them, owing to the inclination of the slots to the lines in which such pressure is exerted, so that, although the sections be subjected to strong pressure, while metal or other material is wound upon the drums, they will not collapse. When, on the other hand, the shaft or sections are rotated with respect to each other in the opposite direction, which is that of unwinding, the pins will move to the outer ends of the slots and draw the sections together, as shown by Fig. 3 of the drawings, whereby the actual circumference of the drum is reduced, so as to permit the roll upon it to readily slip off. The end of the strip to be wound may be secured to the winding-drum in any desired manner, such as by inserting its ends between any of the openings between the sections thereof or by manually winding it upon the drum until a frictional grip thereupon has been secured.

Although I have shown an arrangement of pins mounted in heads attached to the shaft and plates secured to the ends of the drum-sections and slotted to receive the pins, I do not limit myself to such connections between the drum-sections and shaft, as I may employ other connections built upon the same principle in their stead.

Various devices may be used for automatically expanding and contracting the drum-sections.

For an illustration of a device for automatically expanding them, I have herein shown a frictional device consisting of a metallic bow I, encircling the inner end of the drum and supported by a foot I', and having secured within it a leather strap J, passed through a loop K at the lower end of the bow, and having its upper ends secured to movable blocks L and L', mounted upon the ends thereof and adjustable thereon for varying the tension of the strap which directly engages with the peripheries of the inner ends of the two drum-sections with the development of sufficient friction to retard them when the shaft is first started and cause their pins D to be thrown to the inner ends of the slots. This device therefore makes the expansion of the drum-sections entirely automatic. It may, however, be replaced by any other means suitable to the purpose; or, and particularly when the sections are heavy, centrifugal force may be relied upon to automatically separate the drum-sections.

As an example of an automatic device for contracting the drum when it is stopped, I have shown a ratchet-wheel M, mounted on the shaft and engaged by a pawl N, connected through a slot O and pin O' with the upper end of a lever P, the lower end whereof is provided with a pin P', entering a slot Q, formed in a horizontal lever Q', provided at one end with a pedal, which is not shown, and having its other end curved upward and

pivoted to a support R, and terminating in a shifting fork S, which enters the groove formed in the shifting collar S' of an ordinary clutch T. Under the described construction of ratchet and pawl and the combination thereof with the clutch, the pawl N is thrown into position to engage with the teeth of the ratchet M, just as soon as the power is cut off from the shaft G, whereby the said shaft will be abruptly stopped, without, however, stopping the sections A A' of the drum, which are not rigidly connected with it, and which will therefore be carried forward by their inertia and drawn together by the action of the pins D in their slots C and C'. The automatic contraction of the drum is thus effected at the same time the shaft is stopped.

I would have it understood that I do not, however, limit myself to these means for automatically effecting the contraction of the drum.

As shown in Figs. 1 to 7, inclusive, of the drawings, the drum-sections are driven from both ends; but, if desired, they may be driven only from their inner ends, as shown by Fig. 8 of the drawings, in which the shaft-heads U and U' are secured to the opposite ends of a hollow shaft V, rotating around a shaft W, the inner shaft-head U' being adapted at its outer end to be engaged by a clutch X laterally movable on the shaft Y.

It is not essential in carrying out my invention that I should employ the means herein shown for connecting the ends of the drum-sections with the shaft, whether that be solid or hollow, or whether they be driven from one or both ends; but I shall adhere to the principle of connecting the drum-sections and shaft on the basis of two circles, differing in diameter by the distance to which the drum-sections are to be separated when the drum is expanded; nor do I confine myself to any particular means for automatically expanding and contracting the sections. I would therefore have it understood that I do not limit myself to the exact construction shown and described, but hold myself at liberty to make such changes and alterations as fairly fall within the spirit and scope of my invention.

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

1. In a machine for winding sheet metal, the combination, with a shaft, of a winding-drum composed of two or more longitudinal sections and two connections between each end of each section and the shaft, respect-

ively arranged on the basis of two circles differing in diameter by the radial play to be ascribed to the drum-sections, and constructed to operate at a right angle to the shaft, substantially as described.

2. In a machine for winding sheet metal, the combination, with a shaft, of a winding-drum composed of two or more longitudinal sections and two connections between each end of each section and the shaft, respectively arranged on the basis of two circles, as described, and constructed to operate at a right angle to the shaft, and means for automatically separating the sections and bringing them together, substantially as described.

3. In a machine for winding sheet metal, the combination, with a shaft, of a winding-drum composed of two or more longitudinal sections, two connections between each end of each section and the shaft, respectively arranged on the basis of two circles, as described, and a friction device for temporarily retarding the drum-sections when the shaft is started, substantially as described.

4. In a machine for winding sheet metal, the combination, with a shaft, of a winding-drum composed of two or more longitudinal sections, two connections between each end of each section and the shaft, respectively arranged on the basis of two circles, as described, and a device for abruptly stopping the shaft, whereby the drum-sections which are not rigidly connected with it will be thrown forward by inertia and drawn together, substantially as described.

5. In a machine for winding sheet metal, the combination, with a shaft, of a winding-drum composed of two drum-sections, each less than a semicircle in transverse section, a plate secured to each end of each section and conforming in shape thereto and provided with two slots, respectively pitched on the basis of circles differing in diameter by the radial play to be ascribed to the sections, and two shaft-heads mounted upon the shaft at opposite ends of the drum, and each having four rigid inwardly-projecting pins arranged to enter the four slots presented by the two plates on the adjacent sides of the sections and located at the four corners of a square, whereby when the shaft or sections are moved the pins will be shifted in the slots and the sections moved apart or drawn together, substantially as described.

JAMES M. CHATFIELD.

Witnesses:

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J. S. EASTWOOD.