

(No Model.)

2 Sheets—Sheet 1.

R. SMITH.
AUTOMATIC DOCTOR.

No. 365,492.

Patented June 28, 1887.

Fig. 3.

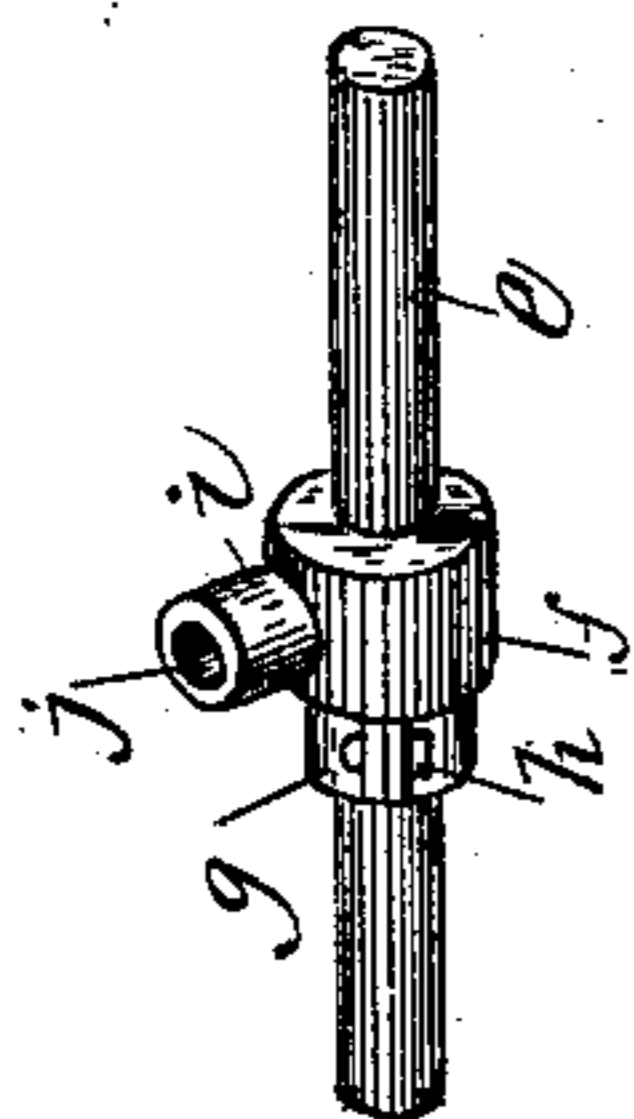


Fig. 1.

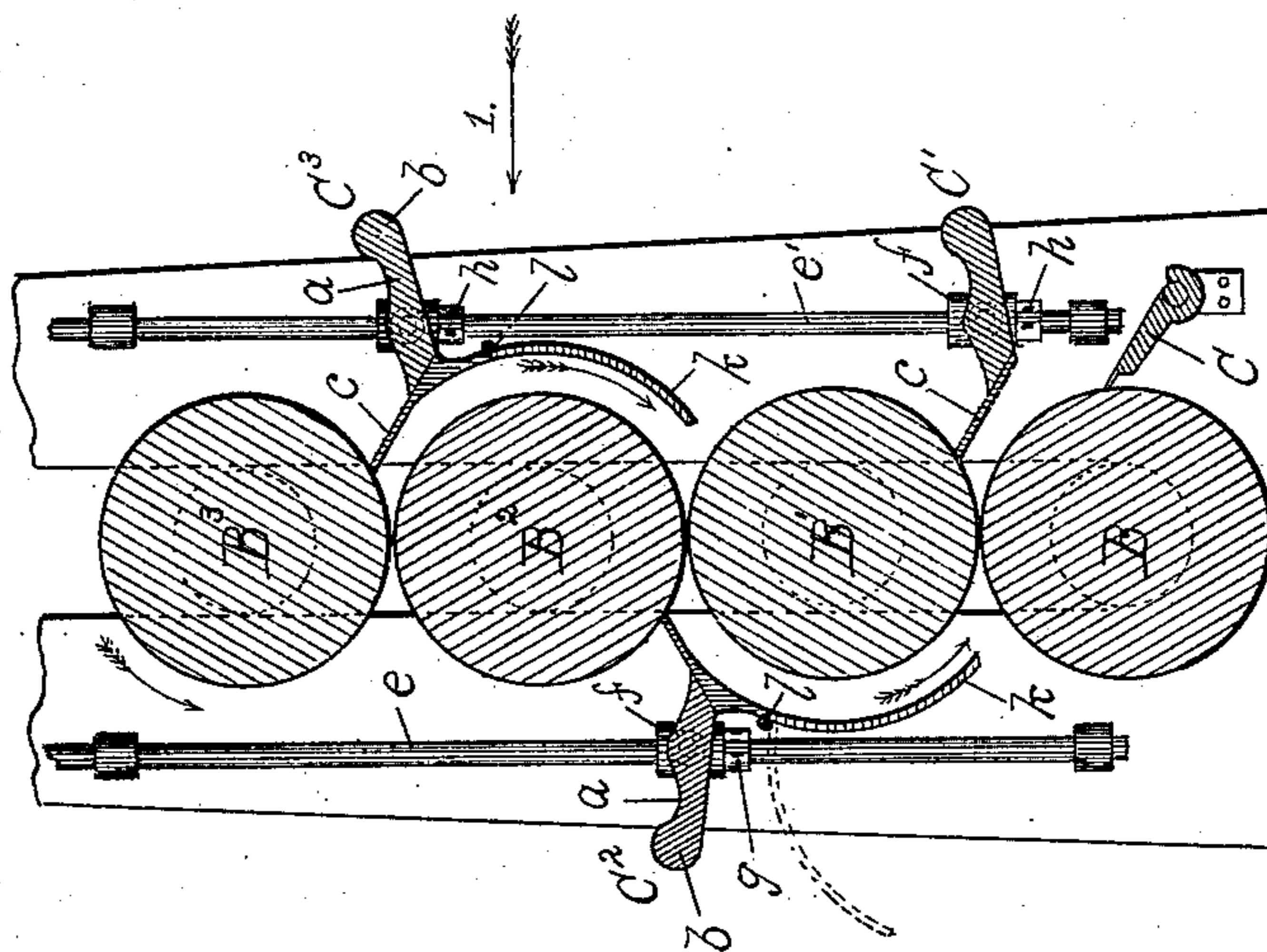
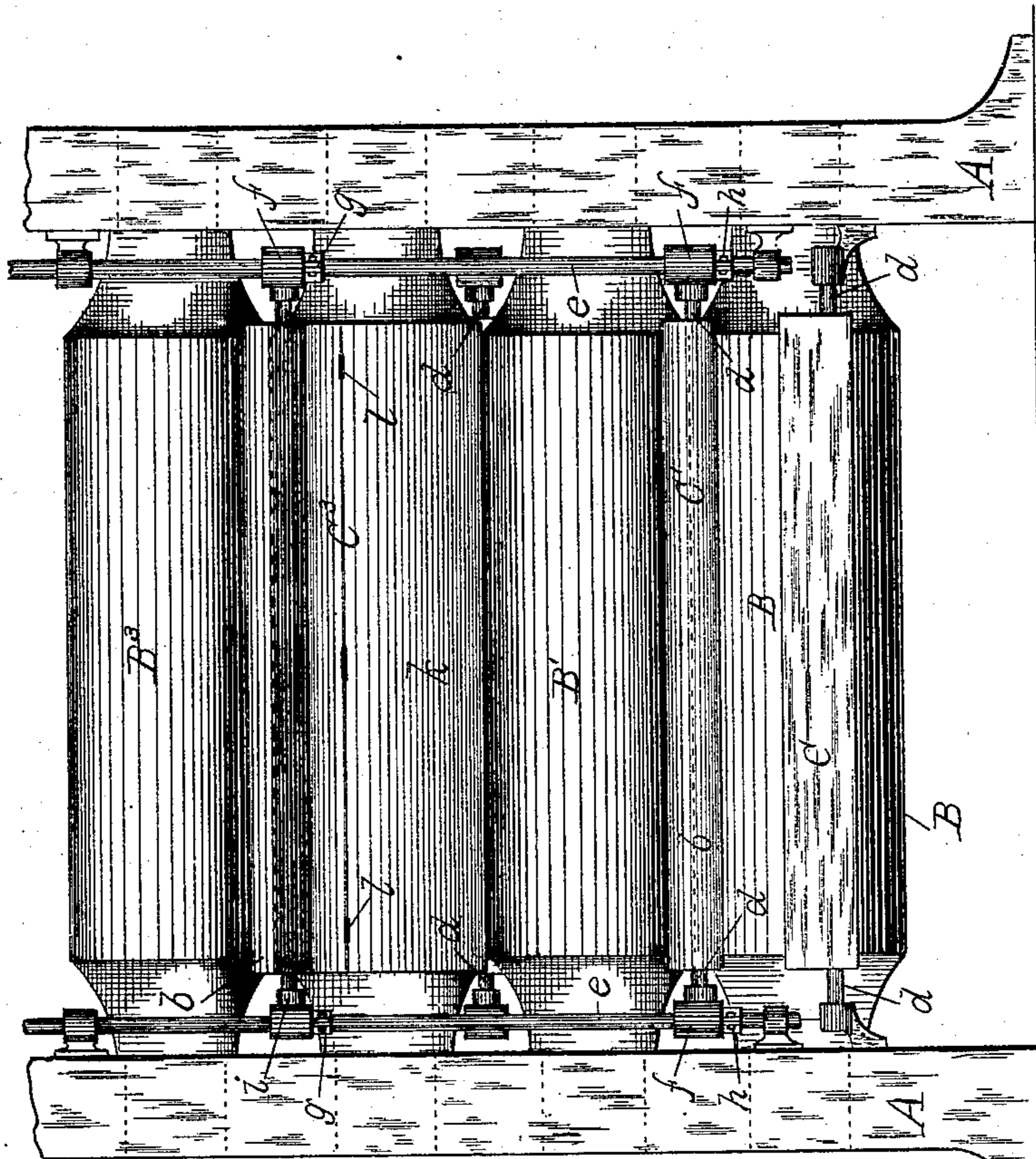


Fig. 2.



Witnesses.
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H. C. Lodge

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F. Curtis, atty.

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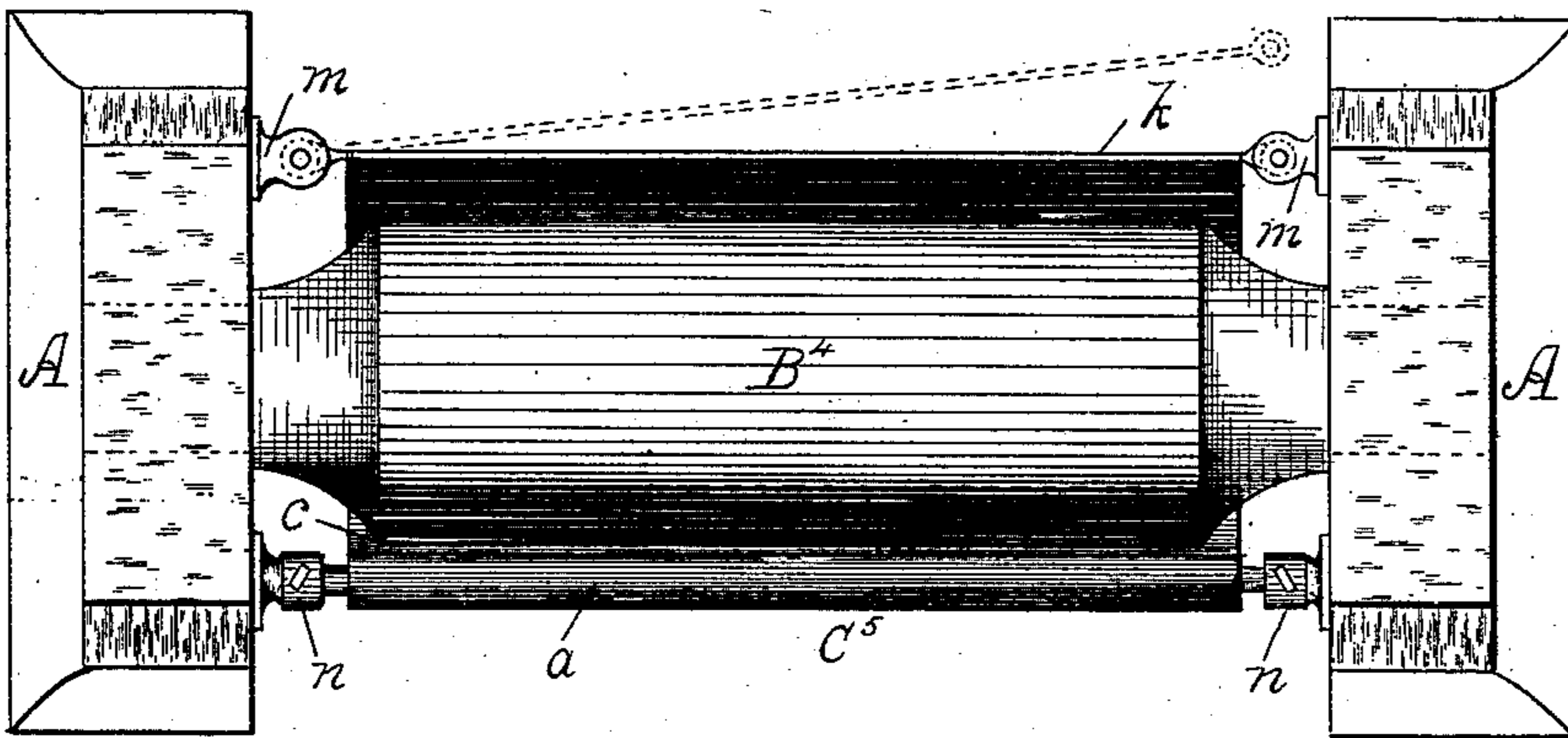


Fig. 6.

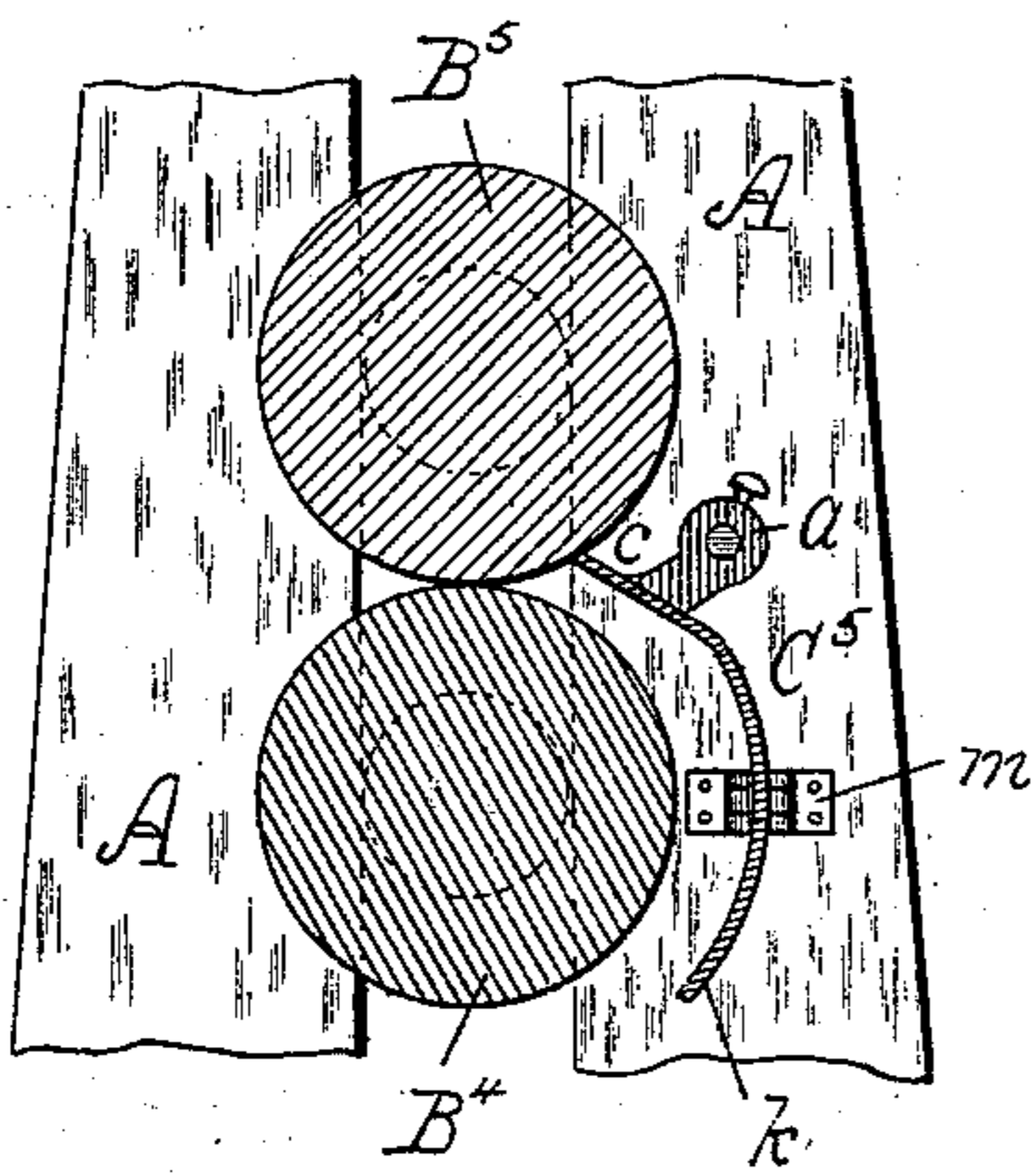


Fig. 4.

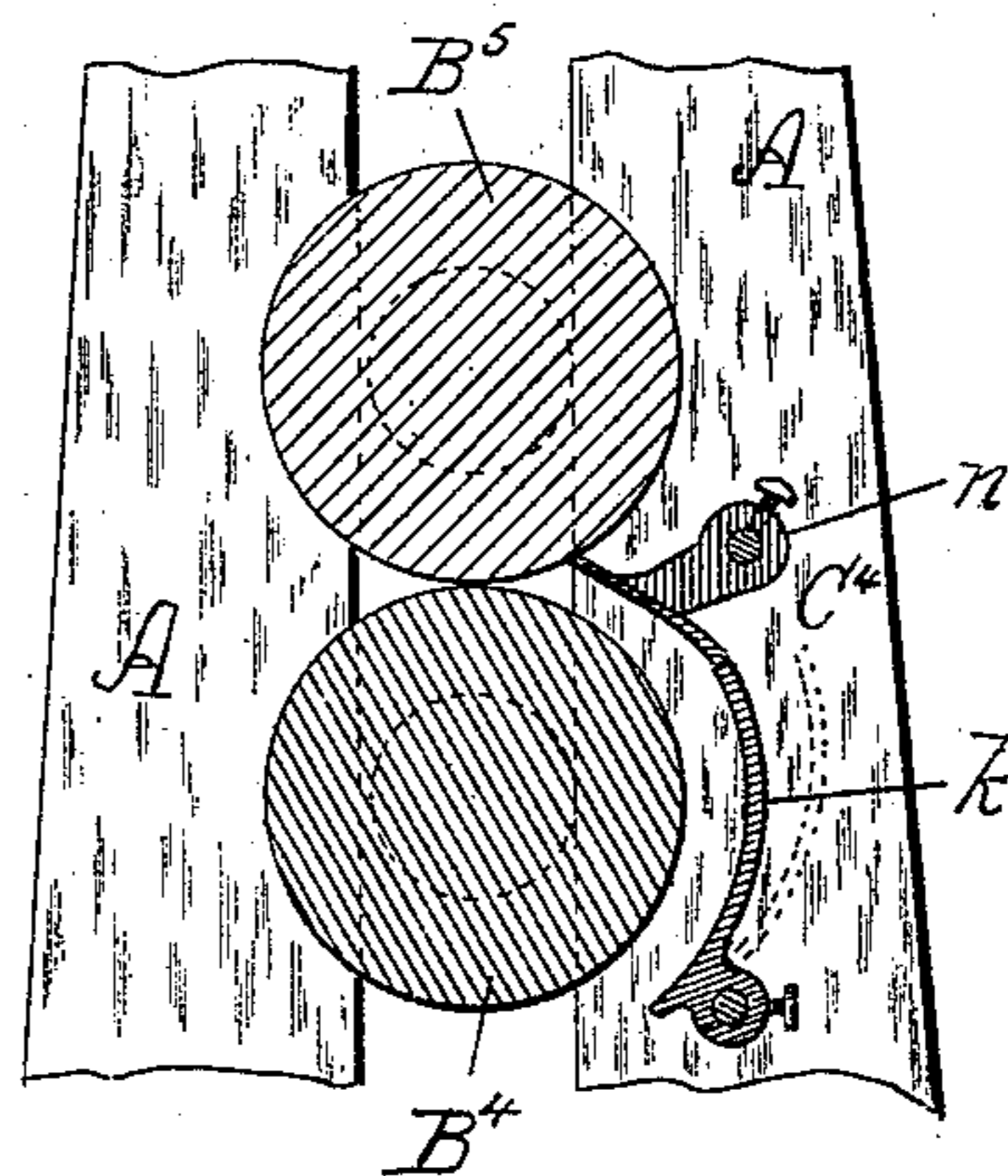


Fig. 5.

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UNITED STATES PATENT OFFICE.

RICHARD SMITH, OF SHERBROOKE, QUEBEC, CANADA.

AUTOMATIC DOCTOR.

SPECIFICATION forming part of Letters Patent No. 365,492, dated June 2^d, 1887.

Application filed August 6, 1886. Serial No. 210,201. (No model.)

To all whom it may concern:

Be it known that I, RICHARD SMITH, a citizen of the Dominion of Canada, residing at Sherbrooke, in the county of Sherbrooke and Province of Quebec, Canada, have invented certain new and useful Improvements in Automatic Doctors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

This invention relates to "doctors," so called, which are employed most generally on paper-making machinery; and in the present instance it consists in their application and peculiar adjustment upon calender-stacks by which each doctor may co-operate with one of the rolls of the stack and so compel the paper-web to follow a particular described course about and between the rolls. Since these doctors act primarily as guides, it is very necessary that this device should remain constantly in contact with the surface of the roll with which it co-operates in order to properly and efficiently perform its office. Hence I have so pivoted and constructed the doctors that the weight and center of body thereof shall be laterally disposed axially of and below its center of support. Hence gravity is employed as the active agent, and the various mechanical expedients now used to maintain their contact with the rolls may be dispensed with.

The drawings accompanying this specification represent, in Figure 1, a cross-section of a portion of a calender-stack provided with a series of doctors embodying my invention, while Fig. 2 is a front elevation of the same. Fig. 3 is a perspective view enlarged, showing the pivotal connection of the doctors; and Figs. 4 and 5 are modified constructions of the doctors. Fig. 6 is a plan of the arrangement in Fig. 4, wherein the doctor is shown in position upon the front side, while upon the opposite side the upper part is removed to show the swinging shield.

In said drawings, A A represent twin standards or housings, which support and in which are journaled a series of calender-rolls, B B' B²,

provided with the doctors C C' C² C³, the latter bearing against the faces of the rolls and alternate serially upon either side of the latter. In calendering, the rotation of the rolls is usually rapid, and hence it is necessary to maintain the several doctors continuously against the surfaces of the rolls; otherwise, in the event of the paper-web breaking, it might pass between the doctor and its roll wrap around the latter and cause loss and waste of material. Furthermore, the use of said doctors upon the rolls continually serves to remove any or all specks, and prevents the paper passing through from being marked or otherwise defaced. In the present instance I presume these doctors are to co-operate with a calender-stack in which the continuous paper-web is conducted through mechanically and automatically, and said doctors are shown as located to co-operate with a roll the surface of which is traveling rapidly against the edge of the doctor, as indicated by the arrows. The doctor is, moreover, situated a short distance laterally and above the point of contact of its roll with the one next below, and thereby prevents the paper from sticking to the roll and wrapping around the latter.

Hitherto springs and other mechanical expedients have been adopted to maintain a doctor continually against its co-operating roll; but in the present instance by my improvements I have done away with the use of such devices and now cause the weight of each doctor to be the active agency which shall operate and constantly maintain each doctor in contact with the roll with which it co-operates.

The doctors C² C³ are composed of a metallic plate, *a*, provided with a thickened back or rib, *b*, to increase its strength and weight and extend the entire face of the rolls, projecting slightly beyond. To the plate *a* is secured a steel strip, *c*, which bears against the surface of the roll, and likewise extends the entire length of the latter.

At each end of the metallic plate *a*, and disposed parallel with its longitudinal axis, are affixed short pins or studs *d d*, upon which the doctor pivots, while upon the inner sides of the standards A A are secured four upright rods, *e e e' e'*, similarly arranged upon each side and at the ends of the calender-rolls.

These rods are furnished with T-collars *ff*, which are movable thereupon and are supported and adjusted in position vertically by means of the split collars *g g*. The latter may be held in any desired position upon the rods *e e'* by tightening the bolts *h h*. Furthermore, the boss *i*, forming part of the T-collars, is bored at *j*, into which is inserted the pins *d d* of the doctors. In this way the doctors are free to oscillate; and, furthermore, it will be perceived that the center of body of each doctor is located to one side of and above the position which it would normally assume were the doctor permitted to hang freely and not bear against the roll. Thus, by keeping the doctors in the position above described, each one is actuated against its co-operating roll with a force equal to its effort in assuming its natural position at rest and when actuated solely by gravity. It will be easily seen that by this arrangement the pressure of each doctor may be changed, either by altering the position of the pivots *d d*, by which it is secured upon the T-collars *ff*, or by increasing or diminishing the weight of the rib *b*.

The lowermost doctor, C, is employed to direct the paper-web directly away from the roll B; and, though slightly differing in its arrangement from the other doctors, nevertheless is actuated by gravity and is free to move upon its supports. The roll C', located just above, is adapted to co-operate with it; and, since the paper-web leaves the stack at this point, the shield with which the other doctors are provided is omitted. This shield is to all intents an extension of the steel strip *c*, and is curved to conform somewhat to the shape of the rolls, which it partially incloses, and is hinged at *l* to the strip *c*, to permit of ready access to the surface of the roll, should it be desired.

In Figs. 4 and 5 are shown modified constructions of a doctor and shield embodying my invention, in which the shield, in lieu of being made a part of the doctors C' C', is pivoted independently therefrom. In the event of this construction being employed, the rods *e e e' e'* are dispensed with and the doctor, *per se*, consisting of the plate *a* and strip *c*, is pivoted independently to the standards and secured in position by set-screws; or it may be rendered automatic by providing the rib *b*, as shown in Figs. 1 and 2, while the shield portion *k* is adapted to be swung pivotally to or from the rolls either in vertical or horizontal paths of movement, and when actively positioned unites and co-operates with the strip *c*.

In Fig. 6 is represented in plan a series of calender-rolls to which are applied a series of doctors of the same construction as embodied in C' in Fig. 4. In this drawing the front side is shown in plan complete, while at the rear the upper part of the doctor, comprising the plate *a* and strip *c*, is removed, thereby clearly showing the position and method of mounting

the shield portion *k*. The position of the latter, when thrown back, is represented by the dotted lines. Furthermore, these shields are pivoted upon and secured to the standards in the brackets *m m*, while the upper portion of the doctor is pivoted at *n n*.

In lieu of forming the deflector or shield portion of the doctor from an integral sheet of metal, a series of curved arms or fingers may be employed instead and with equally good results.

I claim--

1. A doctor constructed substantially as herein described and freely oscillating upon pivots disposed above and laterally of a longitudinal axis passing through its center of body, said doctor hanging loosely at all times and free to move vertically in order that it may maintain contact with the roll by its own gravity, for purposes herein stated.

2. In combination with a revolving roll, a doctor swinging freely thereagainst and provided with pivotal supports, which are disposed above and to one side of its center of body axially and adapted to continuously contact the roll and doctor, said doctor hanging loosely at all times and free to move vertically in order that it may maintain contact with the roll by its own gravity, substantially as set forth.

3. The plate *a*, rib *b*, and the curved shield *k*, hinged to the plate and composing a doctor as an entirety, which is pivoted and disposed eccentrically of and above its center of body, said doctor hanging loosely at all times and free to move vertically in order that it may maintain contact with the roll by its own gravity, substantially as herein stated.

4. In combination with the standards A A and the series of rolls B² B³, supported thereupon, the doctors C² C³, loosely hung and forced continuously in contact against the rolls by gravity induced through the pins *d d*, pivoted in the collars *ff* and adjustable upon the rods *e e'*, substantially as and for the purposes set forth.

5. The combination, with a revolving roll, B', the standards A A, and the rods *e e'*, secured thereto, of the freely-moving doctor C, composed of the plate *a*, rib *b*, and strip *c*, and pivoted upon the pins *d d*, as and for the purposes herein described.

6. In a standard provided with a series of revolving rolls, the combination, with the pivoted plate *a* and strip *c*, secured to said standard, of a shield, *k*, likewise pivoted thereto and movable with respect to the rolls, the whole forming a doctor, substantially as herein stated.

In testimony whereof I affix my signature in presence of two witnesses.

RICHARD SMITH.

Witnesses:

H. E. LODGE,

WM. H. BABCOCK.