

(No Model.)

3 Sheets—Sheet 1.

C. BÖTTER.
PAPER MACHINE.

No. 280,123.

Patented June 26, 1883.

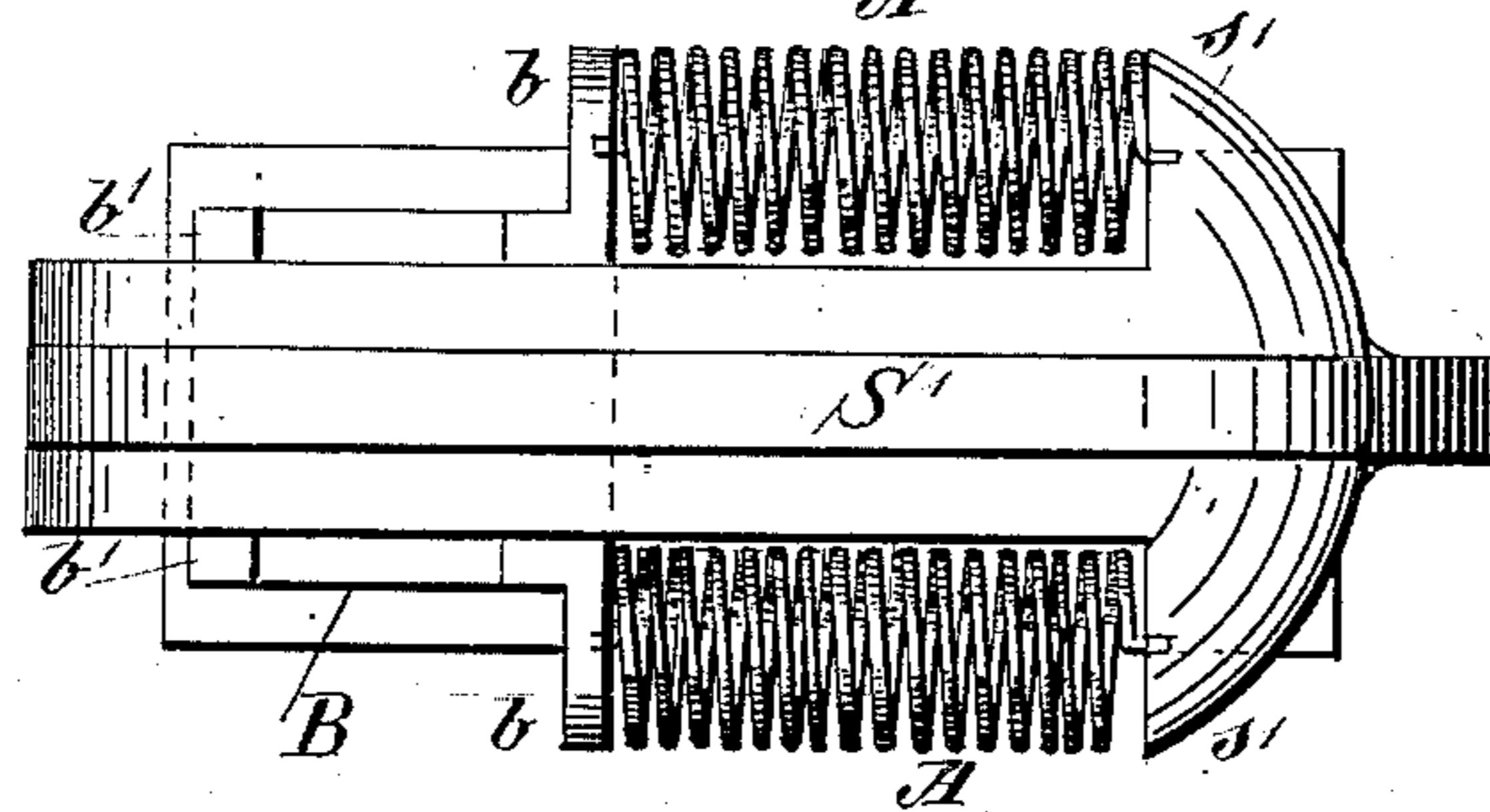


Fig. 2.

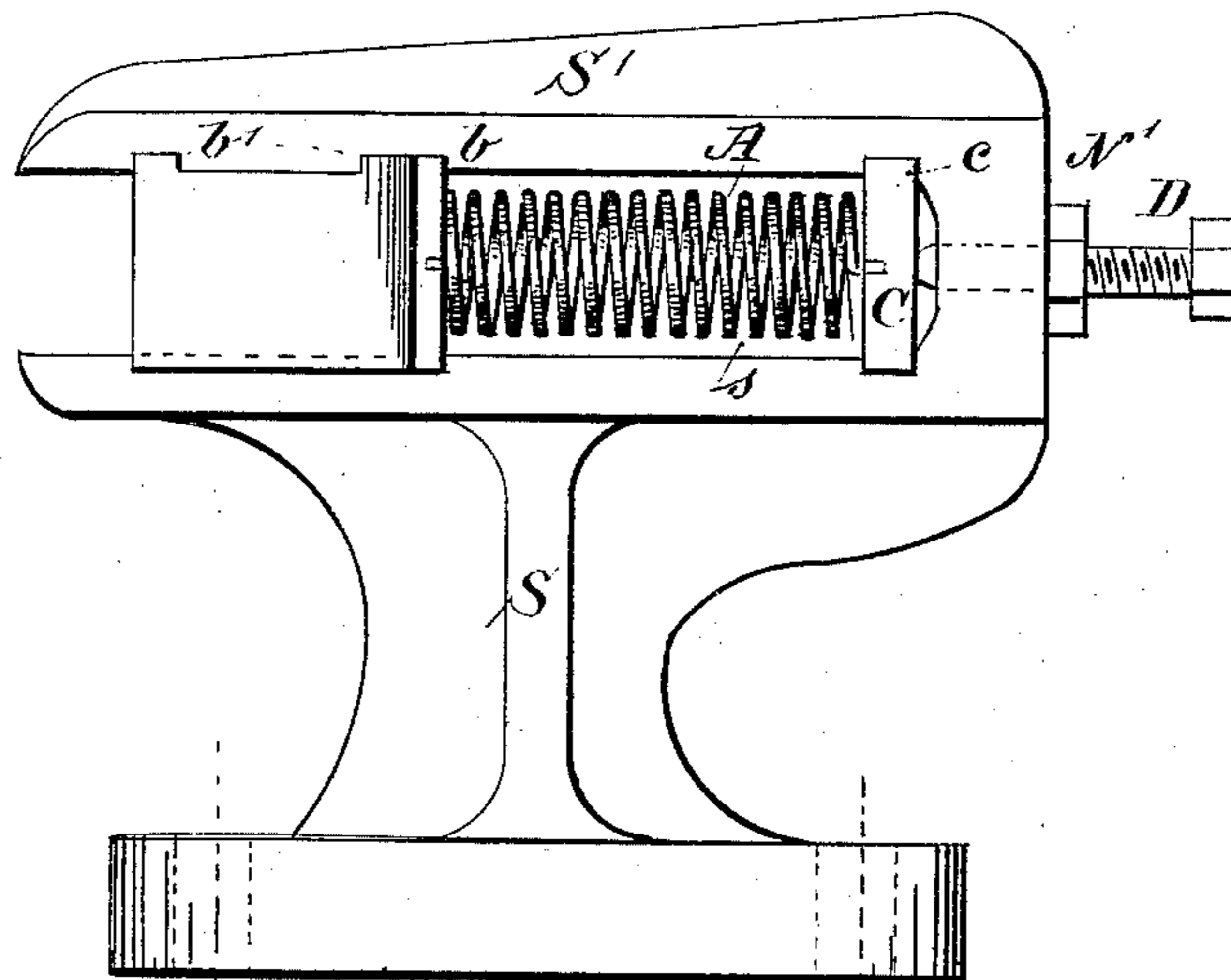


Fig. 4.

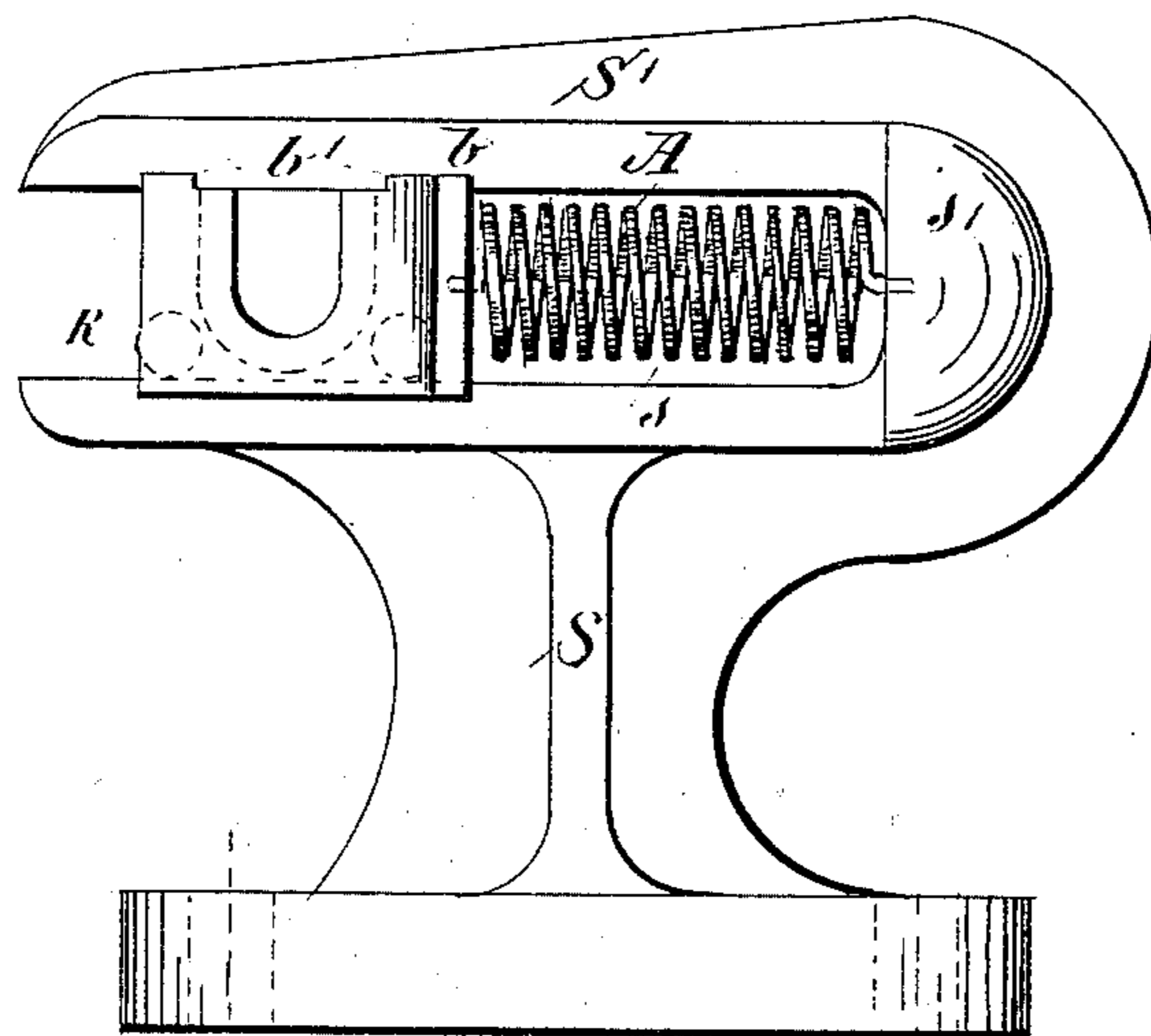


Fig. 1.

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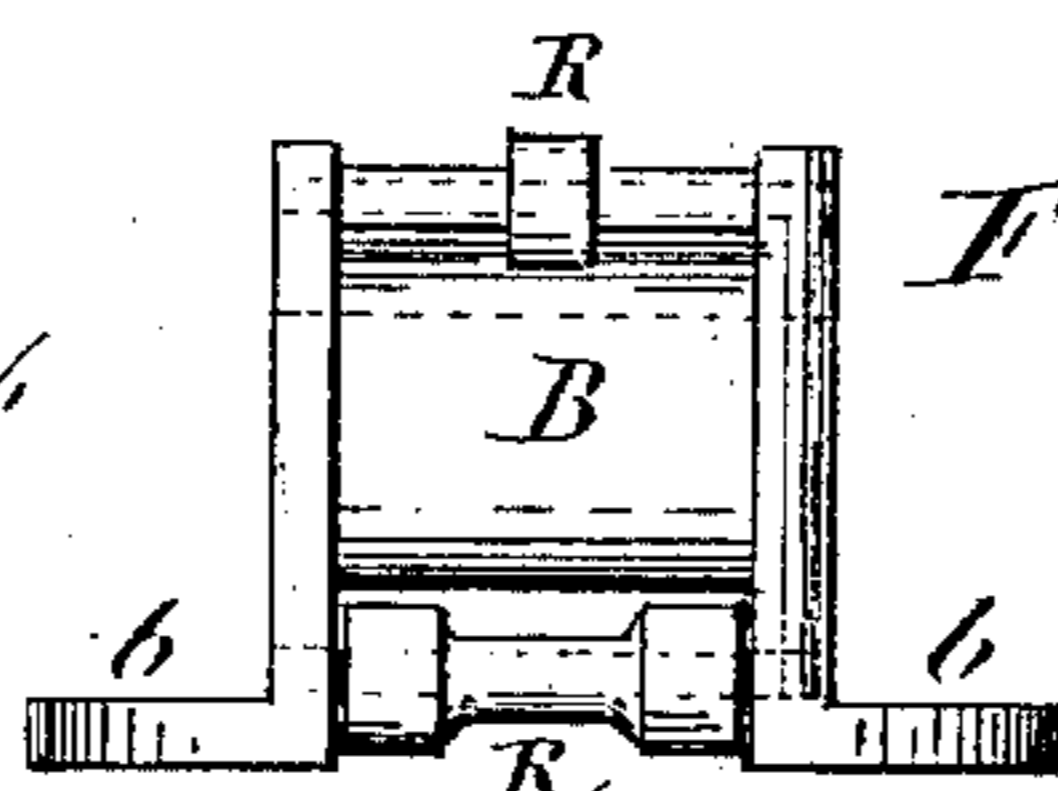


Fig. 3.

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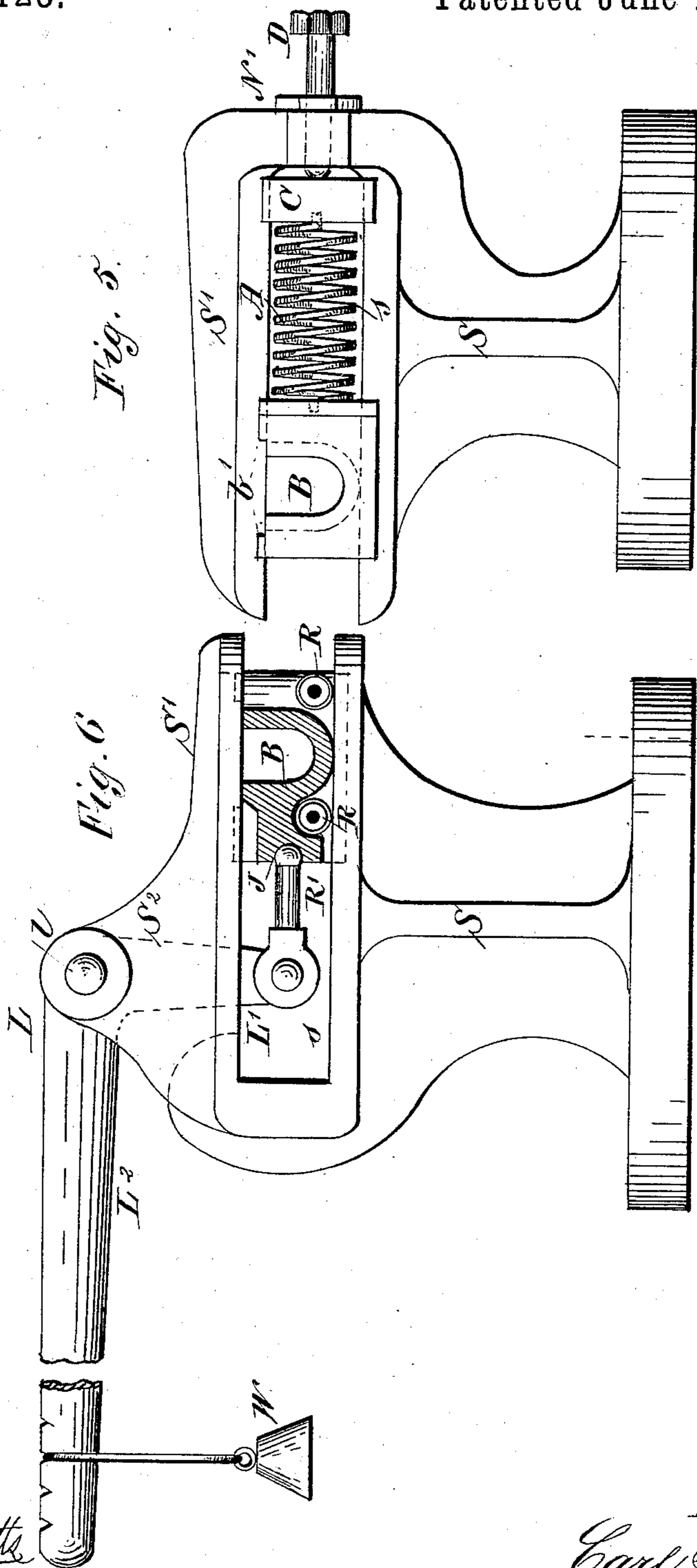
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3 Sheets—Sheet 2.

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3 Sheets—Sheet 3.

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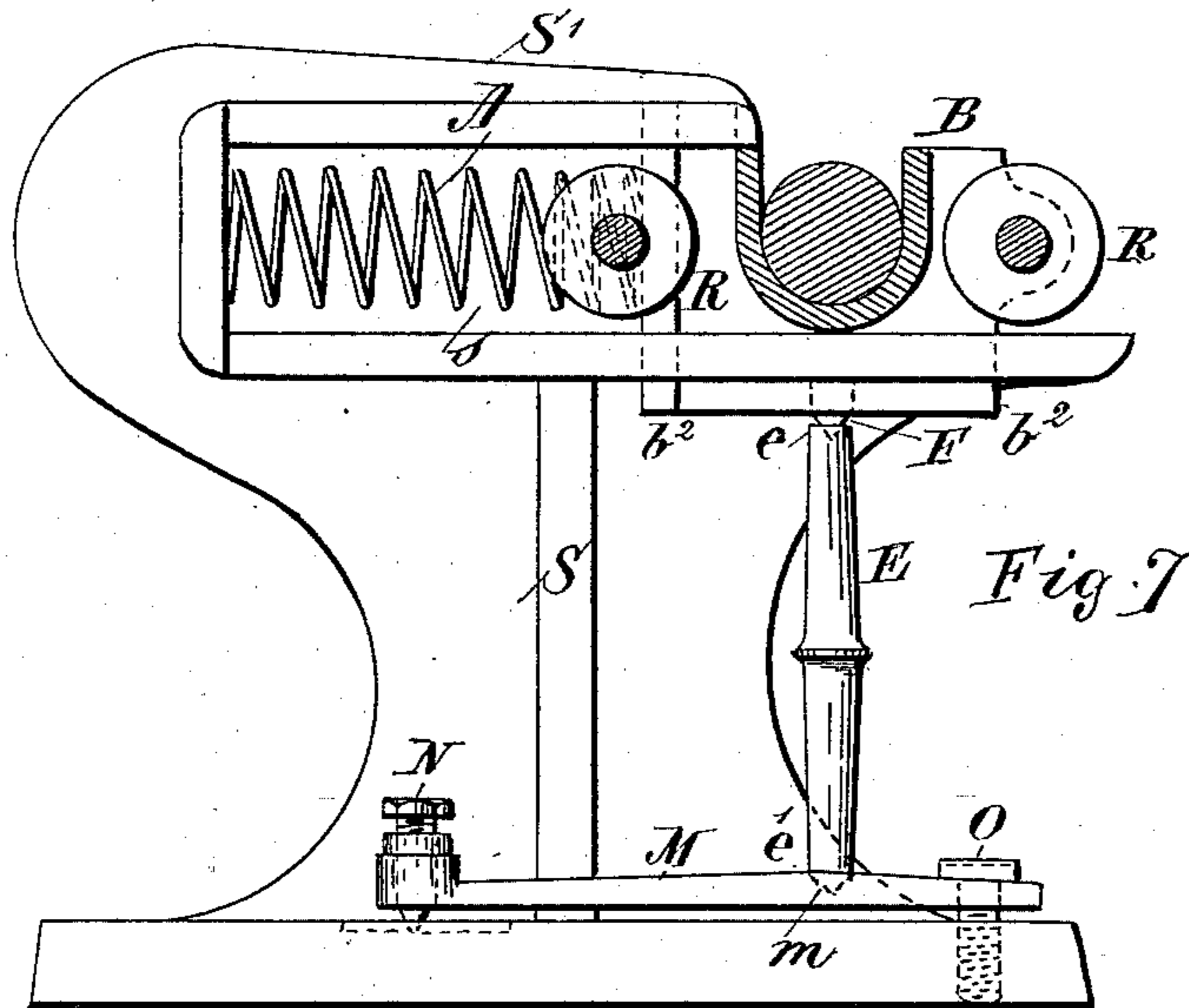


Fig. 8

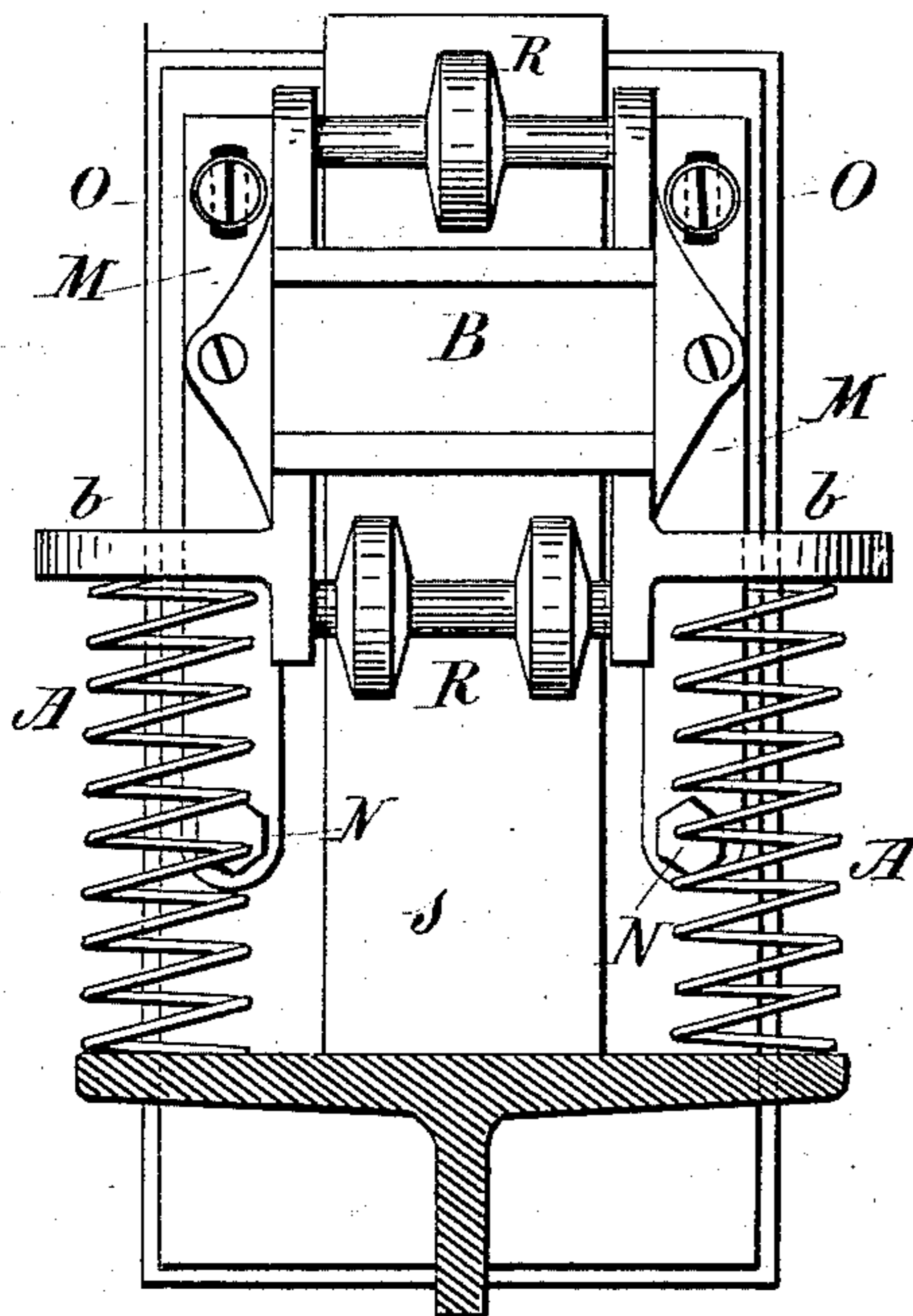
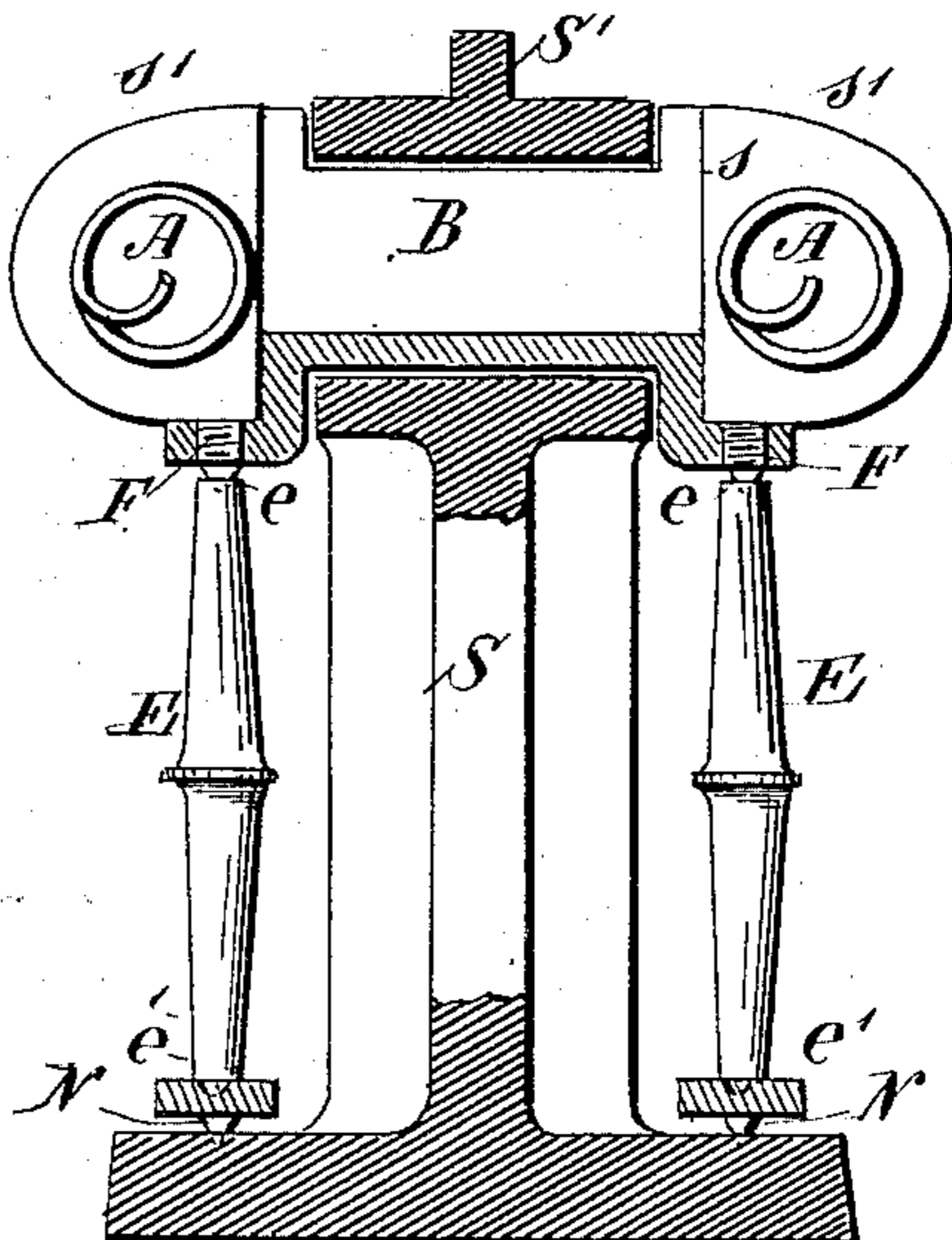


Fig. 9



Witnesses

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UNITED STATES PATENT OFFICE.

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PAPER-MACHINE.

SPECIFICATION forming part of Letters Patent No. 280,123, dated June 26, 1883.

Application filed March 8, 1883. (No model.) Patented in Belgium February 28, 1883, No. 60,588; in France February 28, 1883, and in England February 28, 1883, No. 1,084.

To all whom it may concern:

Be it known that I, CARL BÖTTER, a subject of the King of Prussia, residing at Ober-Ursel, Prussia, German Empire, have invented certain new and useful Improvements in Paper-Machines; 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.

In view of the limited tenuity of the fibrous materials now employed in the manufacture of paper, and the rapidity with which the paper is made to travel through the paper-making machines, repeated breaks occur, which are due either to irregularities in the function of the prime motor or in the mechanism of the machines, as well as to the variations (due to atmospheric influences) in the lengths of the driving-belts.

The object of my invention is to avoid these frequent breaks by mounting the feed or guide rolls in resilient bearings that will counteract and compensate any irregularity in the function of the operating mechanism, and consequently in the tension of the paper lengths, between two such rolls or sets of rolls, as hereinafter fully described, and shown in the accompanying drawings, in which—

Figures 1 and 2 show in elevation and by a plan view, respectively, one construction of appliances by means of which I attain the object of my invention. Fig. 3 is an under side view of the bearing proper. Fig. 4 is a side elevation illustrating means for adjusting the tension of the springs. Figs. 5 and 6 show in elevation other constructions of appliances for attaining the desired results. Fig. 7 is a sectional side elevation, Fig. 8 a plan view, and Fig. 9 a transverse section, of my improved bearing, showing means for annulling the elastic resistance of the weight of the guide-rolls.

Like letters of reference indicate like parts in the above figures of drawings.

In paper-making machines as heretofore

constructed the guide-rolls are mounted in bearings rigidly connected to their standards or to the framing of the machine; and if any irregularity occurs in the speed of these rolls, or in the speed of any of the other operating devices, or in that of the prime motor, the paper at some point is unduly stretched and breaks, causing serious losses both in material and time.

This invention is designed to reduce to a minimum the occurrence of these breaks, if not to overcome the difficulty entirely, by mounting the rolls in bearings adapted to yield to any excess in the normal tension of the paper in any direction, or to take up the slack, if such should occur. Various means may be employed for effecting the desired result; but whatever may be the nature of the mechanism employed for imparting the necessary yielding or resilient properties to the bearings, it is desirable that the movements of the latter should be as free as possible upon the supporting devices for such bearings by reducing the friction upon such supporting devices to a minimum. This is best effected by mounting the bearing B upon anti-friction rollers R, as plainly shown in Fig. 3. To impart the necessary resiliency to the bearing B, various appliances may be employed—for instance, as shown in Figs. 1 and 3.

S indicates a standard, the head S' of which has a longitudinal slot, s, for the reception of one of the pillow-blocks or bearings B, in which the guide-rolls of a paper-making machine are mounted, said slot s forming a way upon which the bearing is adapted to ride or slide. The bearing B, mounted on anti-friction rollers R, as set forth, is provided with lateral projections or ears b, the standard S having like projections, s', formed at the rear end of the slot s, to which projections are secured the ends of coiled springs A, that impart to the bearing the necessary resiliency. As shown, the bearing B is held and guided in the slot s of the supporting-standard by means of flanges b', projecting from the upper and lower edges of its lateral faces.

It will be found desirable to provide means

for adjusting the tension of the springs A, in which case the rear end of the said springs is attached to lateral projections *c* of a slide-block, C, Fig. 4, said block being made adjustable by means of a set bolt or screw, D, that is or may be provided with a check-nut, N', for obvious purposes. In this manner the tension of the springs A is readily adjusted to that found most advantageous when the rolls are first mounted, or when the springs have become weakened, or according to the tensile strength of the paper being made.

Instead of two coiled springs A, one only may be employed, as shown in Fig. 5, and instead of the spring or springs other equivalent mechanical devices may be combined with the bearing B—as, for instance, a weighted lever, as shown in Fig. 6. The bearing B, Fig. 6, is connected by a universal or ball-and-socket joint, J, with a link, R', pivoted to the short arm L' of a bell-crank, L, that has its fulcrum *l* upon a suitable standard or projection, S', connected with or formed on the head S' of the supporting-standard S, the said head being suitably slotted for the passage of said short arm L' down into the slot *s*. The long arm L² of the lever L carries a movable weight, W, by means of which the resiliency of the bearing B is adjusted. If the lever L is so arranged that the link R' will lie horizontal (or practically so) in the slot *s* during the slight movements of the lever L, the power exerted thereby upon the bearing will be practically uniform. For that portion of the paper length which is not yet fully pressed, and yet in a wet condition, the elastic resistance of the weight of the guide-rolls should be equilibrated or counterbalanced, which is effected as follows, referring more especially to Figs. 7, 8, and 9, in which E are spindles or upright supports, in the upper ends, *e*, of which are formed conical recesses, that serve as bearings for the conical or pointed screws F, screwed in flanges or ears *b*², formed on opposite sides of the pillow-block or bearing B. The lower end, *e'*, of the spindles E is cone-shaped, and is stepped in conical recesses *m*, formed in a supporting or bearing plate, M. In order to distribute the weight of the roll and its bearings equally upon the spindles E, and to adapt the former for adjustment, the plates M are made adjustable both vertically and longitudinally by means of the set-screws N O at opposite ends of the plates. The set-screw N is pointed or conical, and has its bearing in a correspondingly-shaped groove formed in the base of the standard S. The forward end of the bar M is slotted, the set-screw O passing through the slot into the base of the standard, whereby, as aforesaid, the bar M is made adjustable vertically and longitudinally.

It is obvious that with the construction described the devices employed for imparting the necessary resiliency to the bearings will take up and counteract any shock or strain that would tend to displace the guide-roll horizon-

tally from its normal position, the resistance of the bearings to such displacement being that exerted by the spring, springs, or lever only, since frictional resistance of such bearings in the slot *s* is practically annulled. This method is therefore admirably adapted to prevent the ill effects resulting from variations in the speed of the rolls of a paper-making machine, which may be a differential speed in the rolls of one of the several groups of rolls, or a differential speed in the collective rolls of two or more groups of such. By adjusting the rolls to a maximum working tension and making them sensitive to the slightest irregularity in their speed through the medium of appliances as described, the paper length will be stretched or contracted, according as the disturbance in the speed occurs in one or the other set of rolls. The construction of paper-making machines will be materially influenced by this method. Not only are the difficulties heretofore encountered of increasing the number and properly grouping the drying-cylinders avoided, but the use of calendering-rolls between and in rear of the drying-cylinders, even for paper that is largely composed of wood, is made possible, and which, although very much desired, has not been possible in machines operated at high speed and constructed as usual.

Although I have described the resilient bearings as more especially applicable to the guide-rolls of paper-making machines, they may be advantageously employed in other machines where adjustable yielding or resilient bearings are desirable.

Having thus described my invention, what I claim is—

1. The herein-described method of obviating the detrimental effects of a variable speed in the prime motor or operating devices of paper-making machines, which consists in varying the length of paper between two or more feed or guide rolls or sets of such, according to the variations in their speed and consequent variation in the tension of the paper, whereby said tension is maintained practically uniform, substantially as described.

2. In a paper-making machine, the combination of two or more guide or feed rolls or sets of such mounted in resilient bearings, substantially as described, for the purposes specified.

3. The herein-described resilient bearings, consisting of the pillow-block or bearing, mounted on anti-friction rollers and arranged to ride in a way formed in its support, in combination with appliances, substantially such as described, to impart resiliency to the bearing, as and for the purposes specified.

4. The support S, having guide-slot *s*, in combination with the bearing B, mounted on anti-friction rollers, and one or more springs, A, substantially as described, for the purposes specified.

5. The combination of the support S, having guide-slots *s*, with the bearing B, mounted on an-

ti-friction rollers R, devices, substantially such as described, for imparting resiliency to the bearing and for adjusting the resilient power thereof, substantially as described, for the purposes specified.

5 6. The combination, with a guide or feed roll of a paper-making machine, its bearings, and a slotted support therefor, of vertically-adjustable spindles, whereby said bearing may
10 be held out of or practically out of contact with the walls of the slot and permitted to oscillate upon and with said spindles, substantially as and for the purposes specified.

7. The combination, with a guide or feed

roll of a paper-making machine, its bearings, 15 and a slotted support therefor, of vertically-adjustable spindles, upon and with which the bearing may oscillate, and appliances, substantially such as described, to impart resiliency to the movements of such bearings, substantially as and for the purposes specified. 20

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

CARL BÖTTER.

Witnesses:

F. VOGELER,
J. GRUND.