

B. F. WARREN.  
Paper-Pulp Screen.

No. 223,967.

Patented Jan. 27, 1880.

Fig. 1.

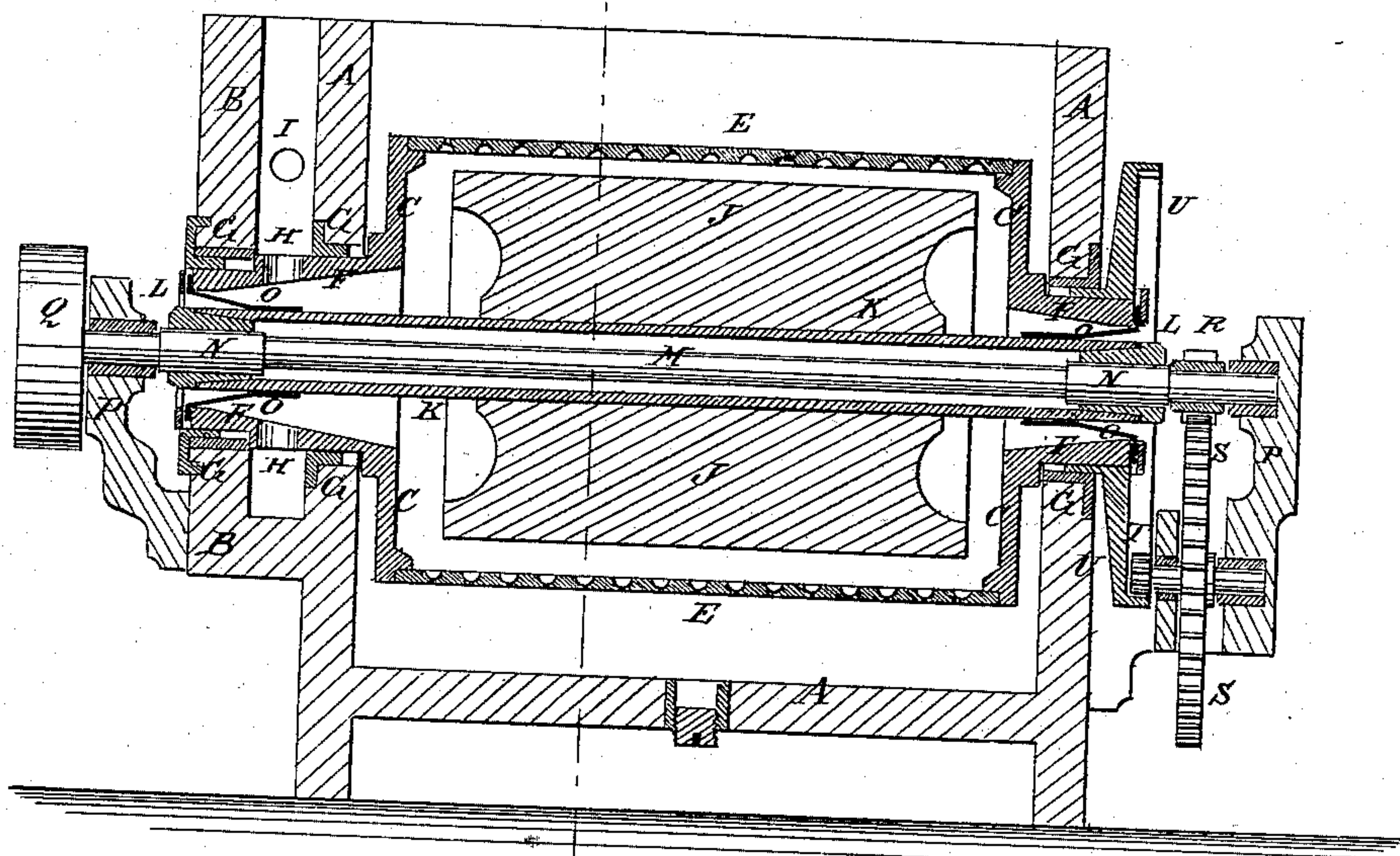


Fig. 2.

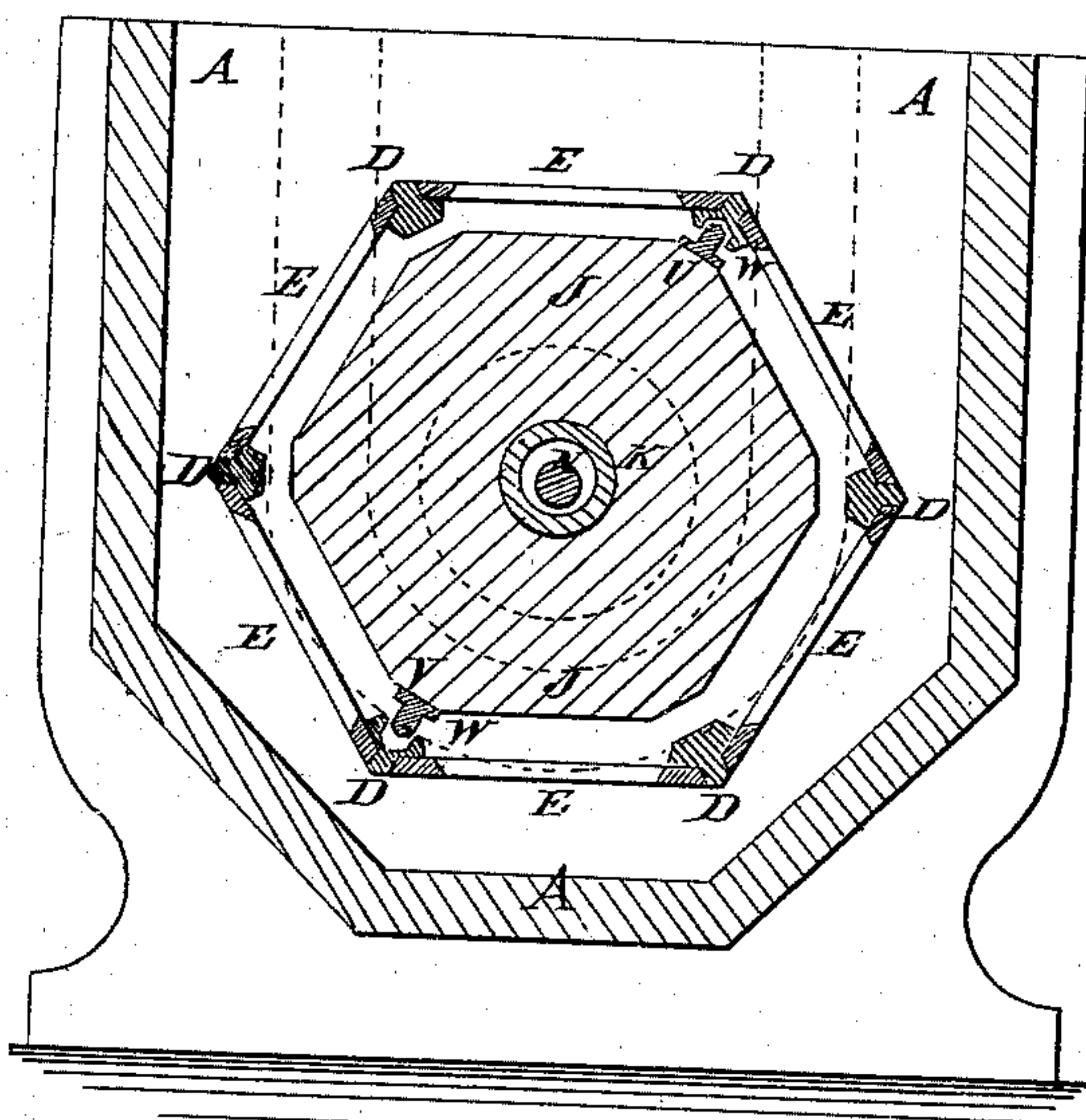
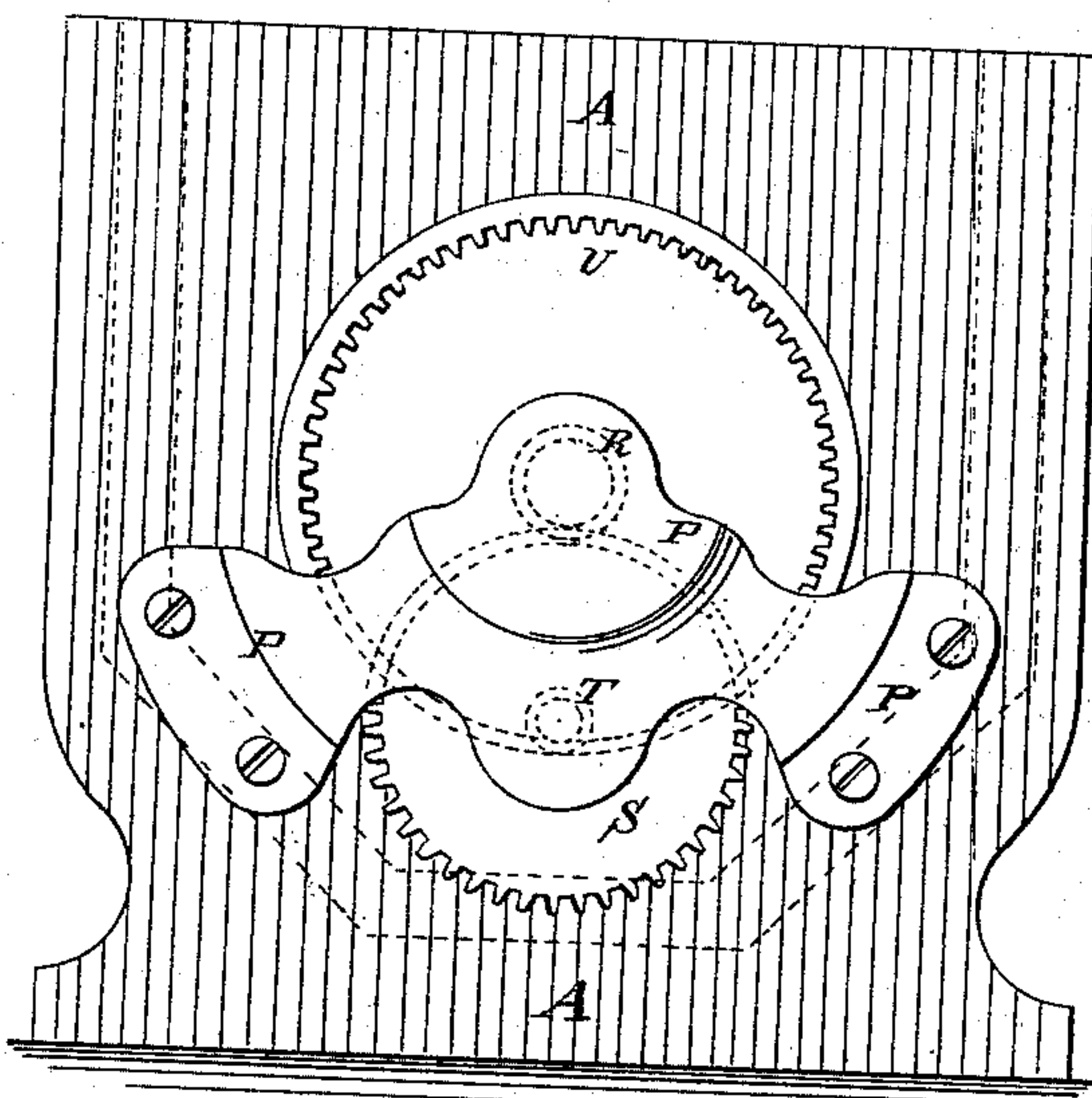


Fig. 3.



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# UNITED STATES PATENT OFFICE.

BENJAMIN F. WARREN, OF CUMBERLAND MILLS, MAINE, ASSIGNOR TO  
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## PAPER-PULP SCREEN.

SPECIFICATION forming part of Letters Patent No. 223,967, dated January 27, 1880.

Application filed October 21, 1879.

*To all whom it may concern:*

Be it known that I, BENJAMIN F. WARREN, of Cumberland Mills, in the county of Cumberland and State of Maine, have invented a new and useful Improvement in Paper-Pulp Screens, of which the following is a specification.

Figure 1 is a sectional side elevation of the paper-pulp screen. Fig. 2 is a sectional end elevation taken through the line *xx*, Fig. 1. Fig. 3 is an end elevation.

The object of this invention is to furnish paper-pulp screens so constructed as to pulsate the pulp in a simple and effective manner, and which may be adjusted to vary the pulsations as required.

The invention consists in constructing a polygonal pulp-screen with a similarly-shaped interior drum arranged to vibrate within the screen, and thus give the pulsations; also, in mounting the drum upon a tubular shaft revolving upon adjustable eccentric bearings arranged to vibrate the drum and allow the vibrations to be varied; and also in connecting the vibrating shaft with the tubular journals of the screen by flexible tubular bearings, so that the pulp cannot escape through the said journals around the shaft vibrating within them, as will be hereinafter fully described.

A represents the pulp-vat, the bottom of which is made semi-cylindrical in form. To one end of the vat A is attached the discharge-chamber B. Within the vat A are placed two polygonal plates, C, which may be hexagonal, as shown in Fig. 2, or with any desired number of sides. The plates C are connected at their angles by bars D, the said plates and bars forming the screen-frame. The side edges of the plates C and bars D are rabbeted to receive the screens E, which screens are slotted in the usual way, and are secured in place by screws. Upon the outer sides of the plates C are formed tubular journals F, which pass through and work in stuffing-boxes G in the ends of the vat A. One of the tubular journals F is made long, so as to pass through the discharge-chamber B and work in a stuffing-box, G, in the wall of the said discharge-chamber B.

In the longer hollow journal F within the discharge-chamber B are formed holes H, through which the pulp passes in its course from the vat A to the discharge-chamber B. The discharge-opening I in the discharge-chamber B is at a lower level than the surface of the pulp in the vat A, so that there may be a constant outflow of the pulp. Within the screen C D E is placed a similarly-shaped drum, J, which is attached to a tubular shaft, K. The ends of the tubular shaft K pass through the outer ends of the tubular journals F, and have their inner surfaces flared, forming conical bearing-surfaces, which bearing-surfaces fit upon sleeves L, placed upon the shaft M. The sleeves or bearings L are eccentric, and are placed upon eccentric collars N, formed upon or attached to the shaft M, so that by adjusting the eccentric sleeves L upon the eccentric collars N the eccentricity of the tubular shaft K with reference to the shaft M may be increased or diminished to vary the pulsations, as may be required. Upon the end parts of the tubular shaft K are placed tubular washers O, of rubber or other suitable flexible material, the outer ends of which, or flanges formed upon the said outer ends, are secured to the outer ends of the tubular journals F by clamping-rings or other suitable means, so that pulp cannot escape between the tubular vibrating shaft K and the tubular journals F. The journals of the shaft M revolve in bearings in brackets P, attached to the ends of the vat A.

To one end of the shaft M is attached a pulley, Q, to receive the driving-belt. To the other end of the shaft M is attached a small gear-wheel, R, the teeth of which mesh into the teeth of the large gear-wheel S. The journals of the gear-wheel S revolve in bearings in the bracket P, and to the end of the inner journal is attached a small gear-wheel, T, the teeth of which mesh into the teeth of the large internally-toothed gear-wheel U, attached to the tubular journal F of the screen C D E.

By this arrangement of gearing the screen C D E will be revolved at a much slower speed than the shaft M, from which it receives motion, and in the reverse direction.

To the angles of the polygonal drum J are attached lugs V, which enter grooves W in



the bars D. of the screen-frame, so that the drum J may be carried around by and with the screen C D E in its revolution.

By this construction the rapid revolution of the shaft M and the double eccentrics L N, attached to it, in connection with the reverse motion of the screen, will vibrate the drum J, and will give the rapid pulsations in the pulp necessary to cause the pulp to pass through the screen-plates E rapidly.

With this construction the pulsation is more positive and uniform over the whole surface of the screen-plates, and the pulp is exposed to less friction than in any of the ordinary arrangements, so that the pulp will be screened more rapidly with the same area of surface, and fewer knots and strings will be formed within the screen. At the same time the movement will be smooth and steady and the resistance constant, so that less power will be required to run the screen, and there will be less strain and wear upon the moving parts than in the ordinary reciprocating screens.

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

1. In a paper-pulp screen, the combination, with the rotary polygonal screen C D E, of a similarly-shaped drum, J, arranged to have a vibratory movement within the said screen C D E, substantially as herein shown and described, to pulsate the pulp and facilitate its passage through the screen-plates, as set forth.

2. In a paper-pulp screen, the combination, with the driving-shaft M and the tubular shaft K, that carries the drum J of the eccentric collars N and the adjustable eccentric sleeves L, substantially as herein shown and described, so that the drum J may receive a vibratory movement within the screen C D E, and thus pulsate the pulp, as set forth.

3. In a paper-pulp screen, the combination, with the tubular journals F of the screen C D E and the tubular shaft K of the drum J, of the flexible tubular packings O, substantially as herein shown and described, so that the shaft K will vibrate within the journals F without allowing pulp to escape, as set forth.

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Witnesses:

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