(No Model.) 3 Sheets—Sheet 1.

W. W. D. JEFFERS.

PULP ENGINE.

No. 371,460. Patented Oct. 11, 1887.

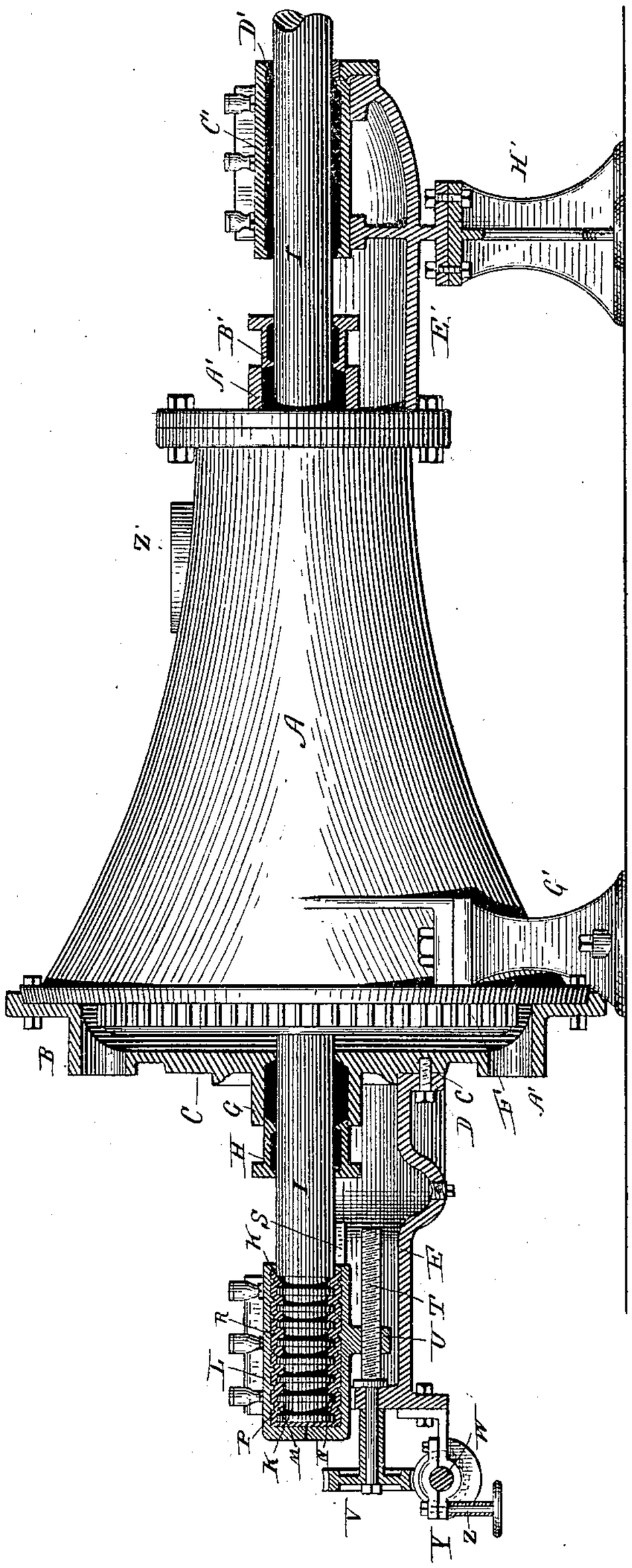

Fig. 1.

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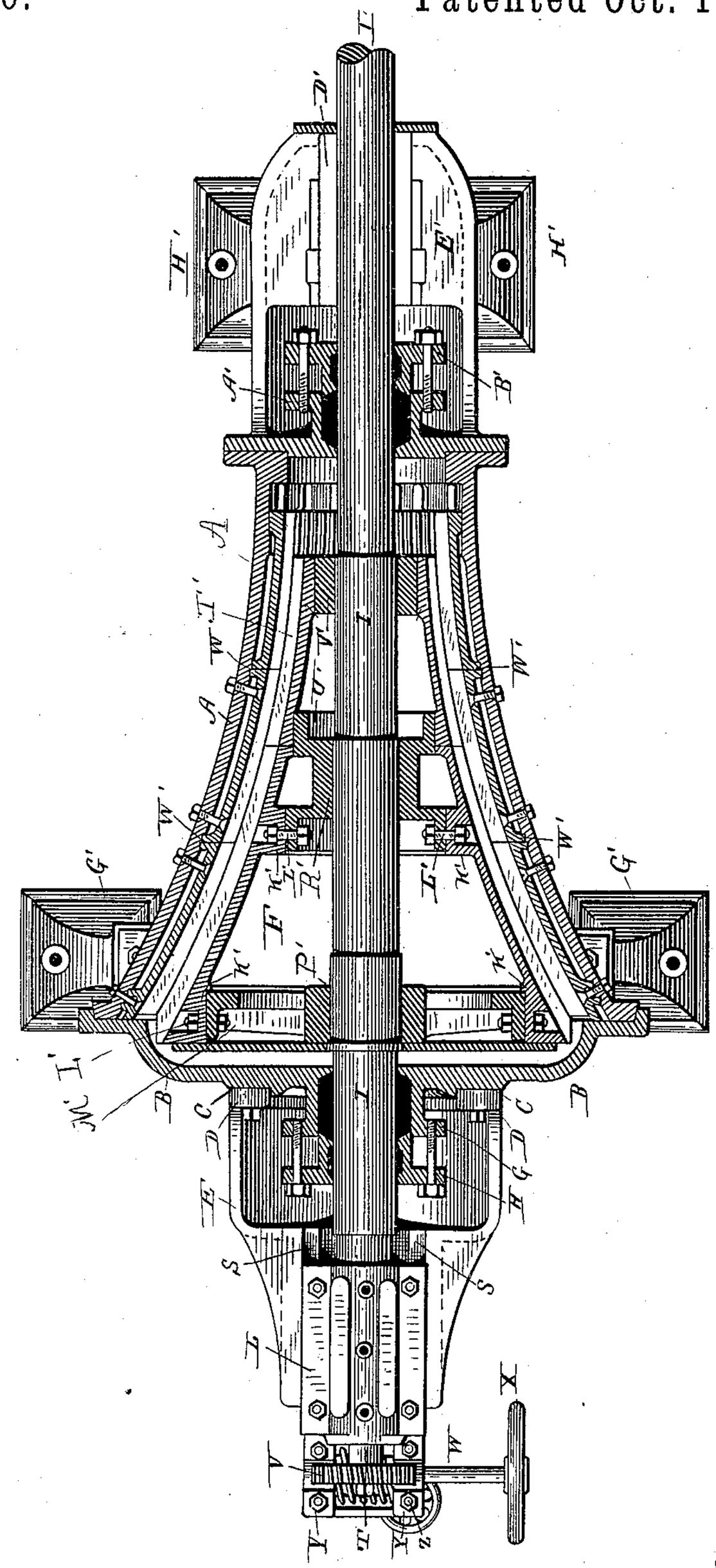

Fig. 2.

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PULP ENGINE.

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Fig. 4.

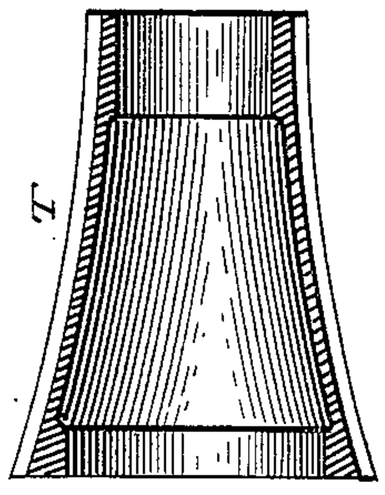


Fig. 6.

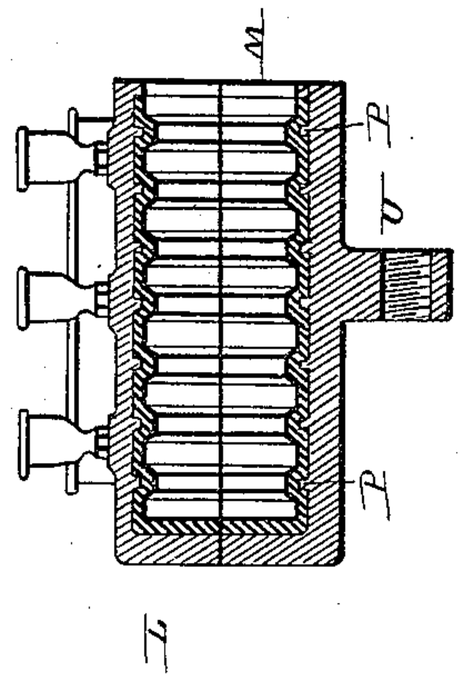


Fig. 3.

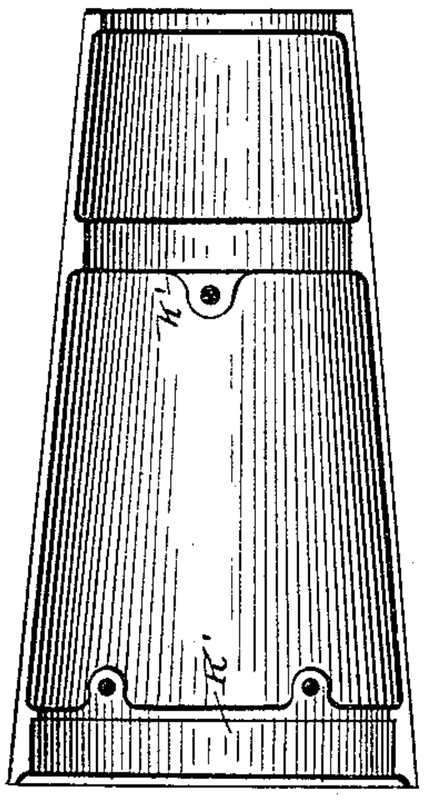
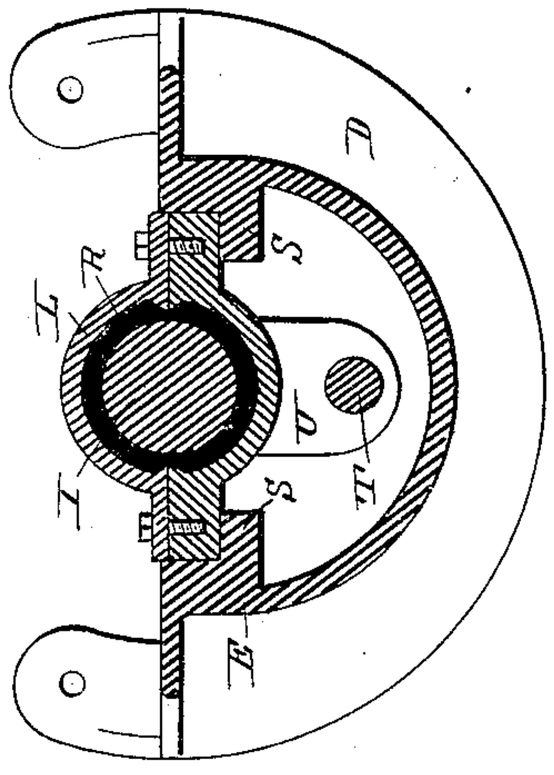


Fig. 5.



WITNESSES

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UNITED STATES PATENT OFFICE.

WALLACE W. D. JEFFERS, OF TICONDEROGA, NEW YORK.

PULP-ENGINE.

SPECIFICATION forming part of Letters Patent No. 371,460, dated October 11, 1887.

Application filed February 17, 1887. Serial No. 227,964. (No model.)

To all whom it may concern:

Be it known that I, WALLACE W. D. JEFFERS, a citizen of the United States, residing at Ticonderoga, in the county of Essex and State of New York, have invented certain new and useful Improvements in Pulp-Engines; and I do 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 the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to certain improvements in pulp-engines for refining paper-stock of all grades and qualities; and it has for its objects to provide for accurately adjusting the grinding-surfaces of the same, so as to draw the fibers out gradually and properly finish the stock, and also to provide for constructing the grinding parts or "plug" in sections, which are secured together upon the shaft and within the cone or shell knives, as more fully hereinafter specified. These objects I attain by the means illustrated in the accompanying drawings, in which—

Figure 1 represents a view, partly in side elevation and partly in longitudinal vertical section, of my improved pulp engine. Fig. 2 represents a longitudinal vertical sectional view thereof; Fig. 3, a detached plan view of a section of the rotary grinder; Fig. 4, a sectional view of another section of the grinder; Fig. 5, a transverse vertical sectional view of the machine, taken on the line *x x* of Fig. 1; and Fig. 6 represents a longitudinal vertical sectional view of a portion of the adjusting mechanism.

Referring to the drawings, the letter A indicates the shell of the engine, which is constructed, preferably, of cast iron or steel, and is conoidal in form, having flanges at each end for the attachment of the respective heads, which are similarly flanged and secured to the flanges of the shell by means of suitable bolts.

The larger head, B, of the shell is provided with an annular groove, C, on its outer face, in which sits the segmental flange D of a semi-tubular extension, E, which forms a support for the adjusting devices of the internal rotary grinder, F. The head is also provided with a central boss, G, having a packing and gland, H, through which passes one end of a central shaft, I, to which the rotary grinder is attached. The said end of the shaft extends outward beyond the gland which forms one of its bearings, and is provided with a series of annular grooves, K, the said end being embraced by the two parts of a box, L, which are clamped and bolted securely around the shaft, the box being provided with a similarly-arranged packing or bushing, M, having grooves N, in which the grooved portion of the shaft turns freely, the packing being provided with annular ribs P on the outside, engaging the grooves R on the inside of the box, whereby it is held in place.

The extension E is provided with longitudinal ways S at each side, in which are adapted to slide the lateral flanges of the box L, so as to guide the box longitudinally as it is advanced or retracted by the adjusting mechanism. The said mechanism consists of a leading-screw, T, passing through a threaded aperture in a lug, U, depending from the lower part of the box. The said screw has a plain shank working in a bearing at the end of the extension E, and having a fixed collar working against said bearing, so as to hold the screw longitudinally. The outer end of said screw has locked to it a worm-wheel, V, the periphery of which intergears with a worm on the shaft W, which is provided with a hand-wheel, X, by means of which it may be operated to move the revolving part or cone of the grinder back and forth accurately, so as to adjust it with respect to the grinding-surfaces of the shell. The worm-shaft has its bearings in a divided box, Y, which at one side has a screw-shaft, Z, provided with a hand-wheel, by means of which the worm may be clamped to lock the parts when adjusted. The central shaft, I, also extends through a boss, A′, at the center of the smaller head of the machine and through a packed gland, B′, and a bearing-box, C′, having a bushing or packing, D′. The said box is constructed in two parts bolted together, and is secured to a longitudinal extension, E′, forming part of the engine. The letters G′ H′ indicate the supports upon which the engine is mounted, which are bolted or otherwise fastened to a suitable base.

The grinding-cone is made of detachable

sections, which are longitudinal conic sections having curved parallel diametrically-opposed bearings K′, which are perforated for the bolts L′, by which they are secured to the seats on the arms M′, extending from the radial arms N′ on the hub P′. The axle or shaft upon which the hub P′ fits is slightly larger than the part of the shaft upon which the hub R′ fits, so that the first can be slipped on over the smaller portion by shrinkage, and the hub R′ afterward similarly fitted and shrunk on, so as to hold the parts, the edges, bearings, and adjoining parts being planed, centered, and adjusted, so as to be interchangeable and readily fitted to each other to provide for ready repairs.

The hub R′ is provided with annular seats, to which the conic sections of the plug or grinder are bolted and seated in a similar manner to the connections at the larger end of the plug or grinder.

The section T′ is composed of one piece, and fits upon shoulders U′ of the section before mentioned. The said section is confined in place by means of an annulus or ring, V′, which is shrunk on the shaft to a portion less in diameter than that carrying the hubs before mentioned, thus confining the sections of the grinder in place. The surface of the grinder is provided with parallel longitudinal teeth or ribs, which co-operate with similar teeth on confined removable sections secured in the shell, as more fully hereinafter specified. The said removable sections are curved to the inner contour of the shell, which is provided with annular seats W′ at intervals, into which the annular ribs of the juxtaposed flanged ends of the removable sections fit and are held. When the heads are applied and secured to the flanged ends of the shell, they confine the parts within the shell in the proper working position.

The letter Z′ indicates the induction-opening of the shell into which the material is fed, and A^2 the eduction-openings controlled by suitable valves, through which the pulped material is discharged.

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

1. The combination, with the shaft carrying the conical grinder, of its annularly-grooved end, the movable box and bushing, the ways on the extension secured to the head, the leading-screw and worm-screw, and the operating-worm, whereby the screw may be advanced or retracted, substantially as specified.

2. The combination, with the central shaft having successively different diameters, of the grinder-sections having varying diameters for the reception of the hubs of the sections of said grinding-cone, substantially as specified.

3. The combination, with the conoidal shell, of the sections adapted to fit therein in annular seats provided for the purpose, the said sections being provided with flanges to rest in said seats and with grinding teeth or ribs, substantially as specified.

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

W. W. D. JEFFERS.

Witnesses:

CHAS. D. DAVIS,

CHAS. L. COOMBS.