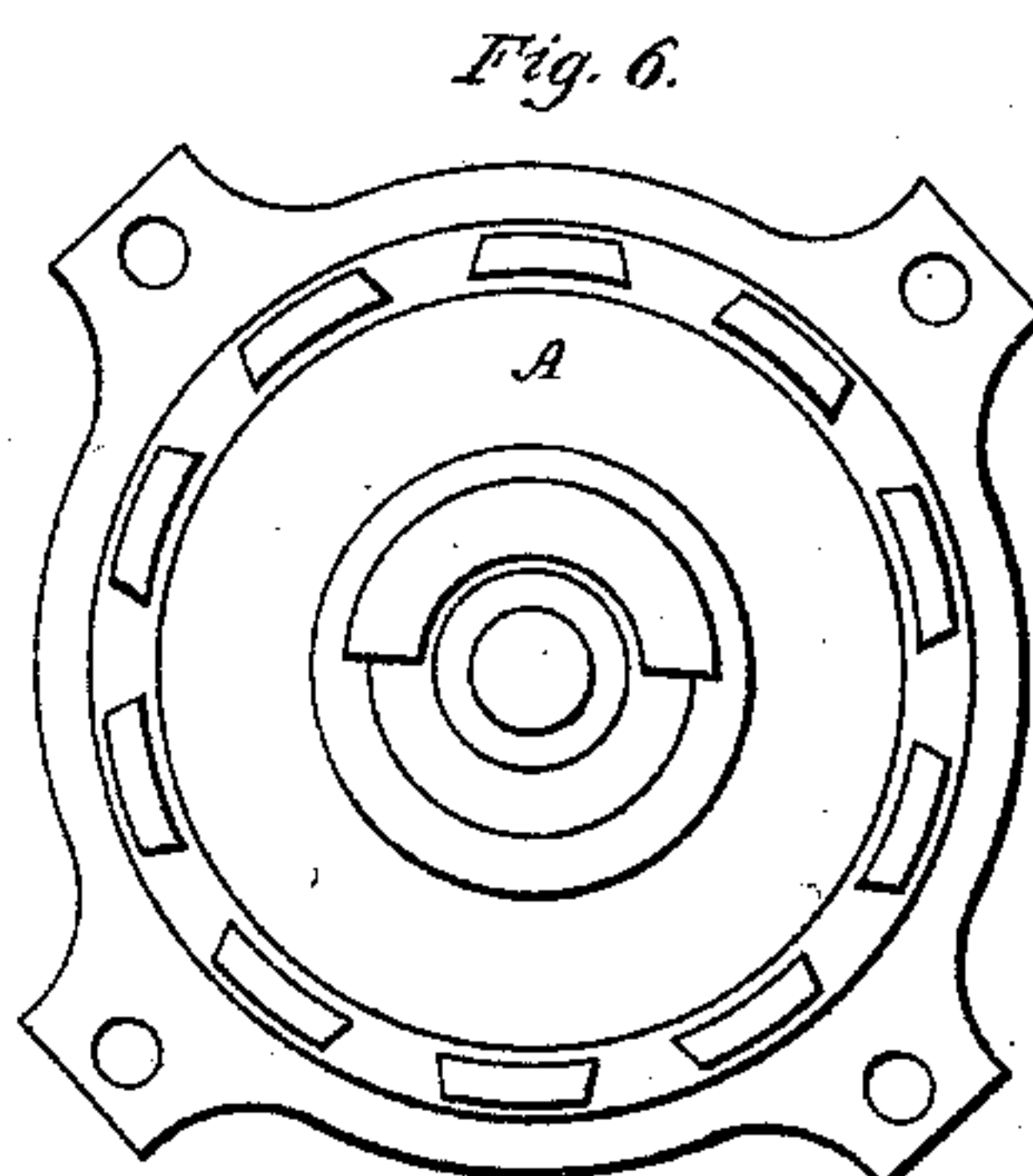
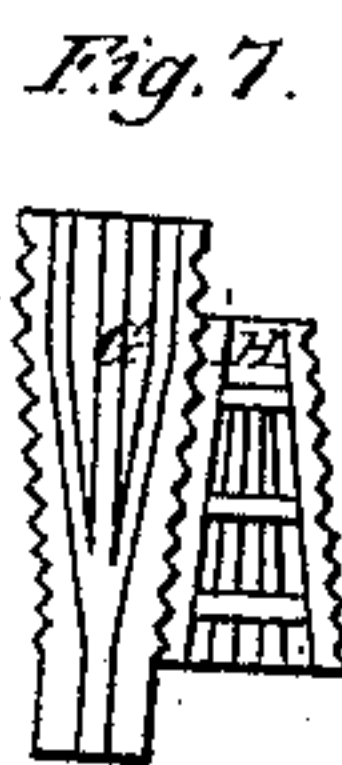
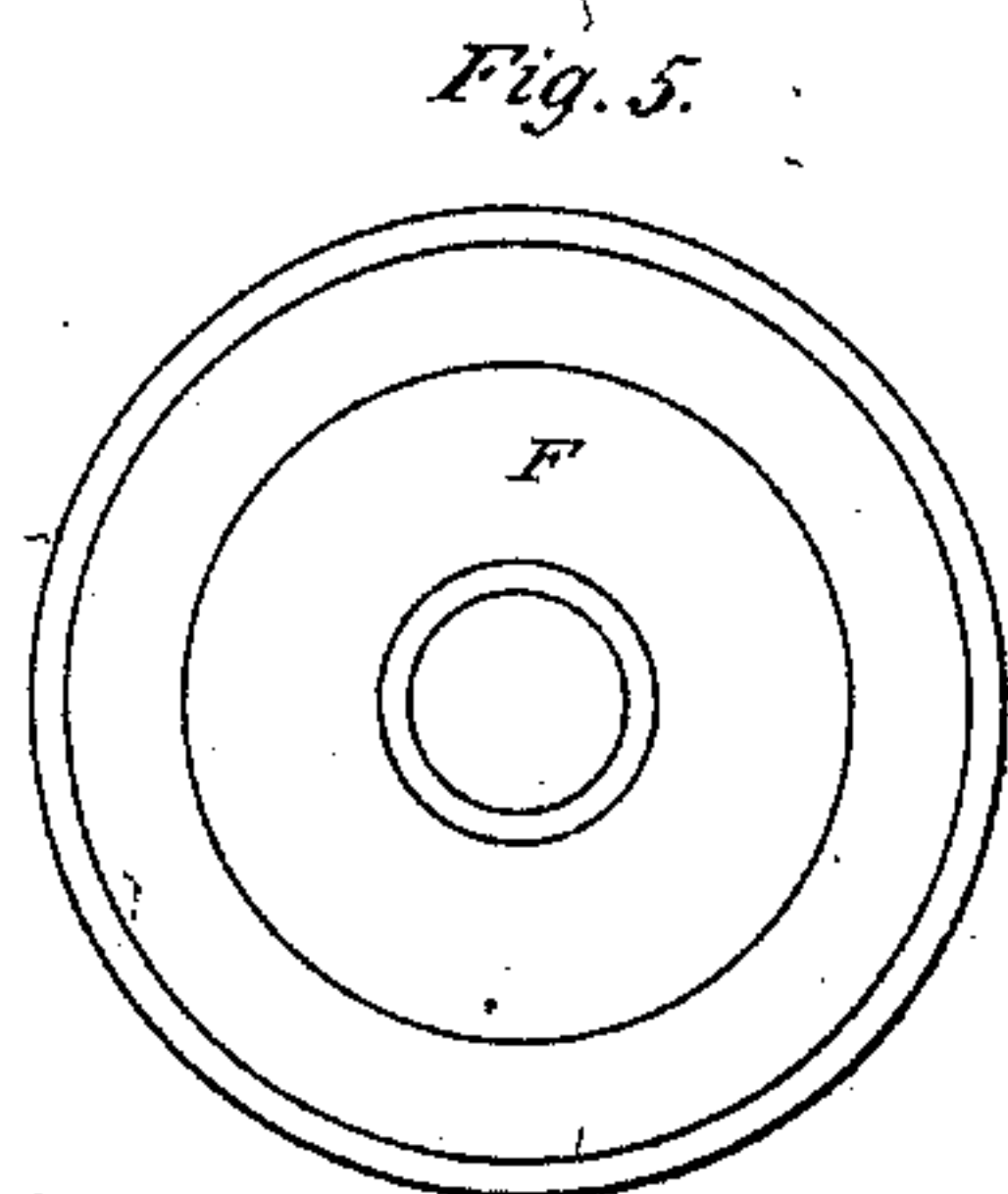
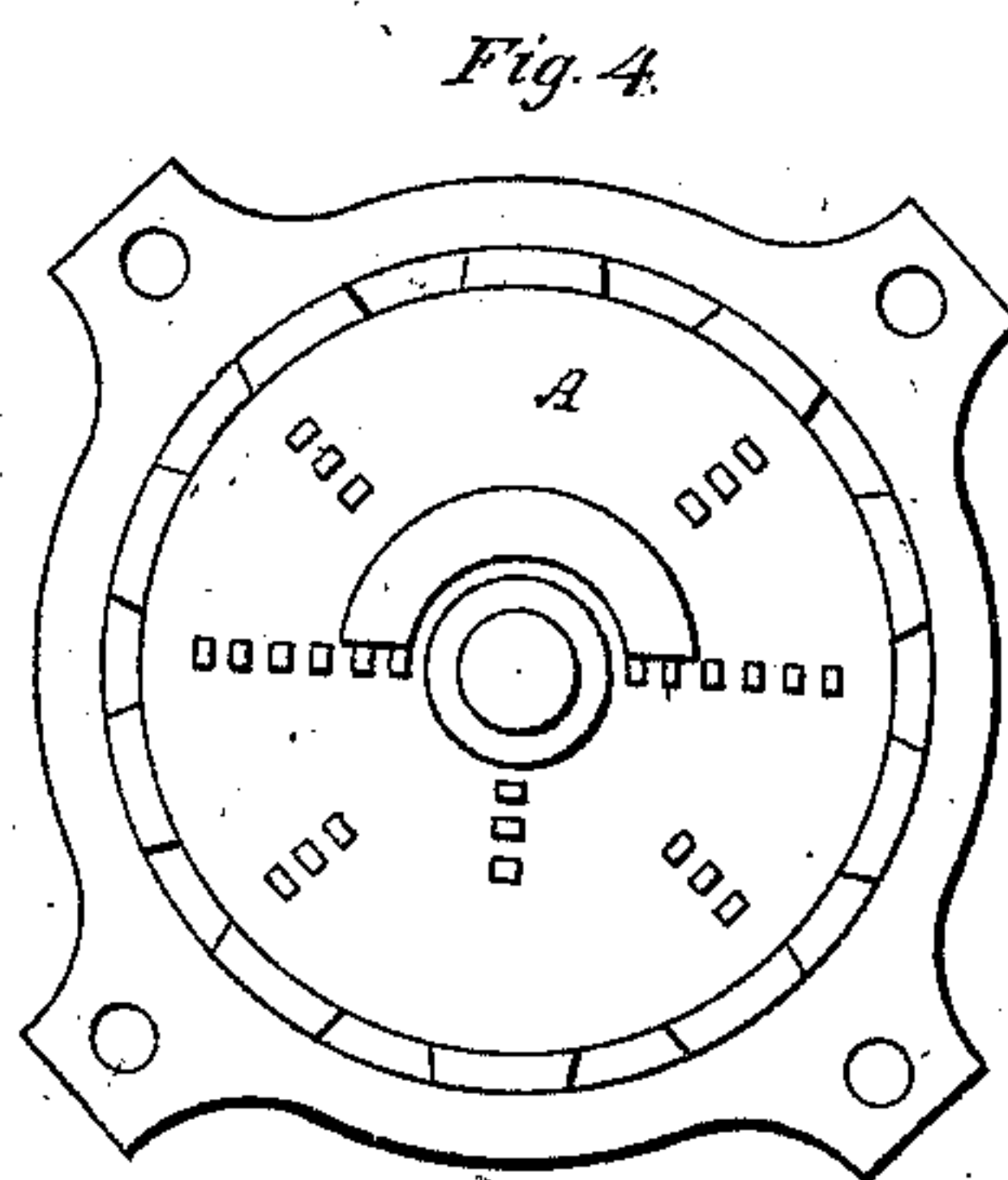
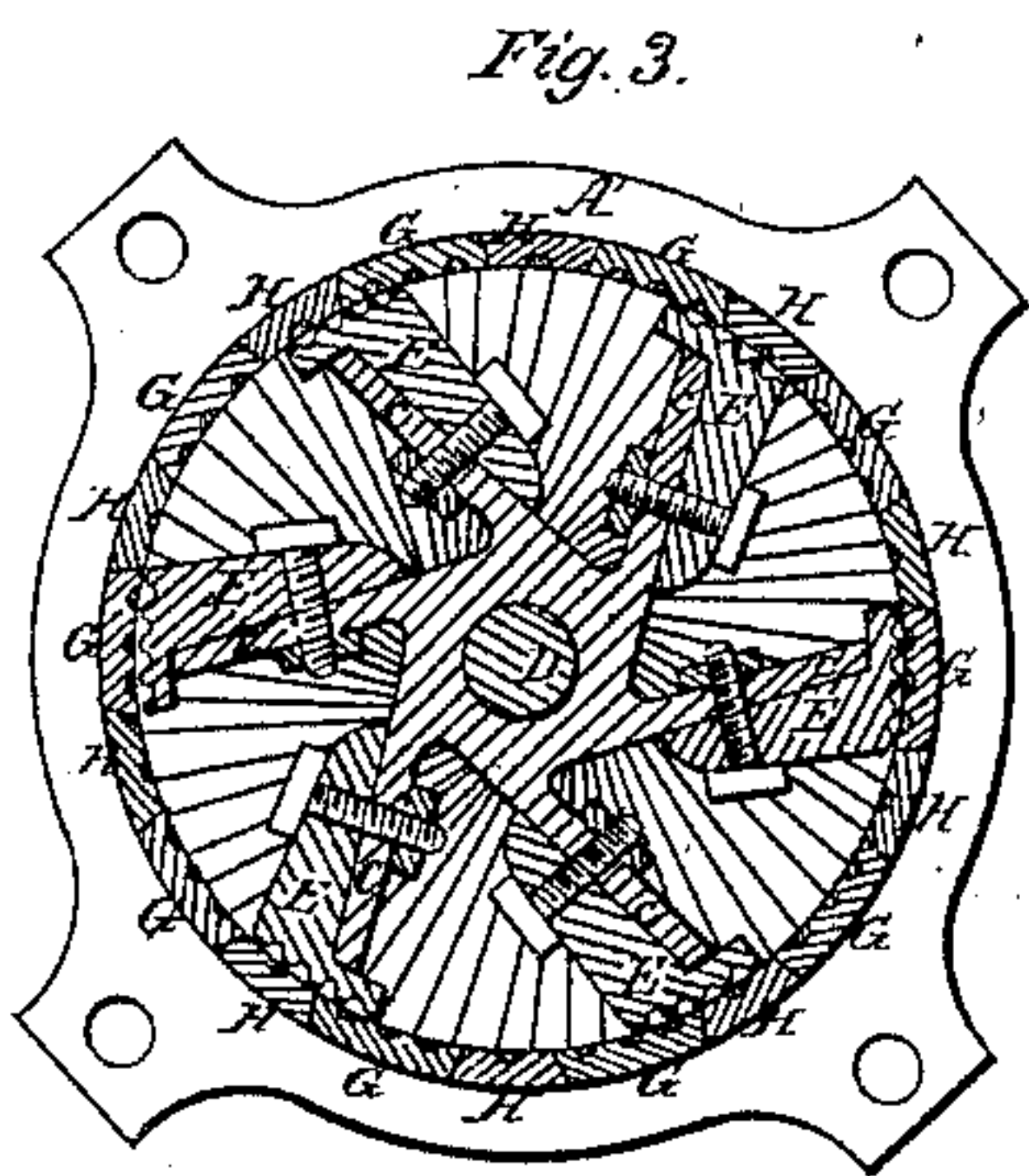
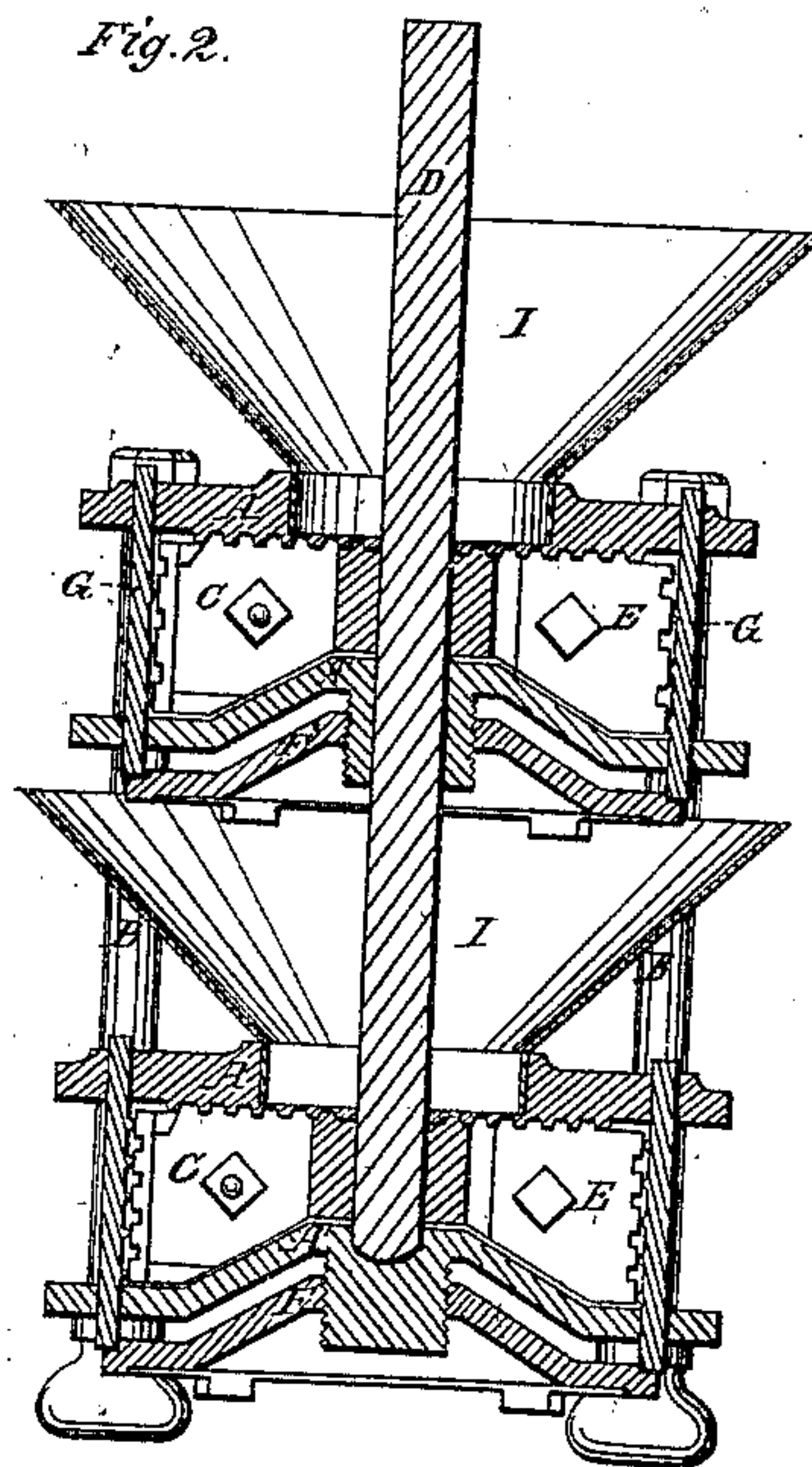
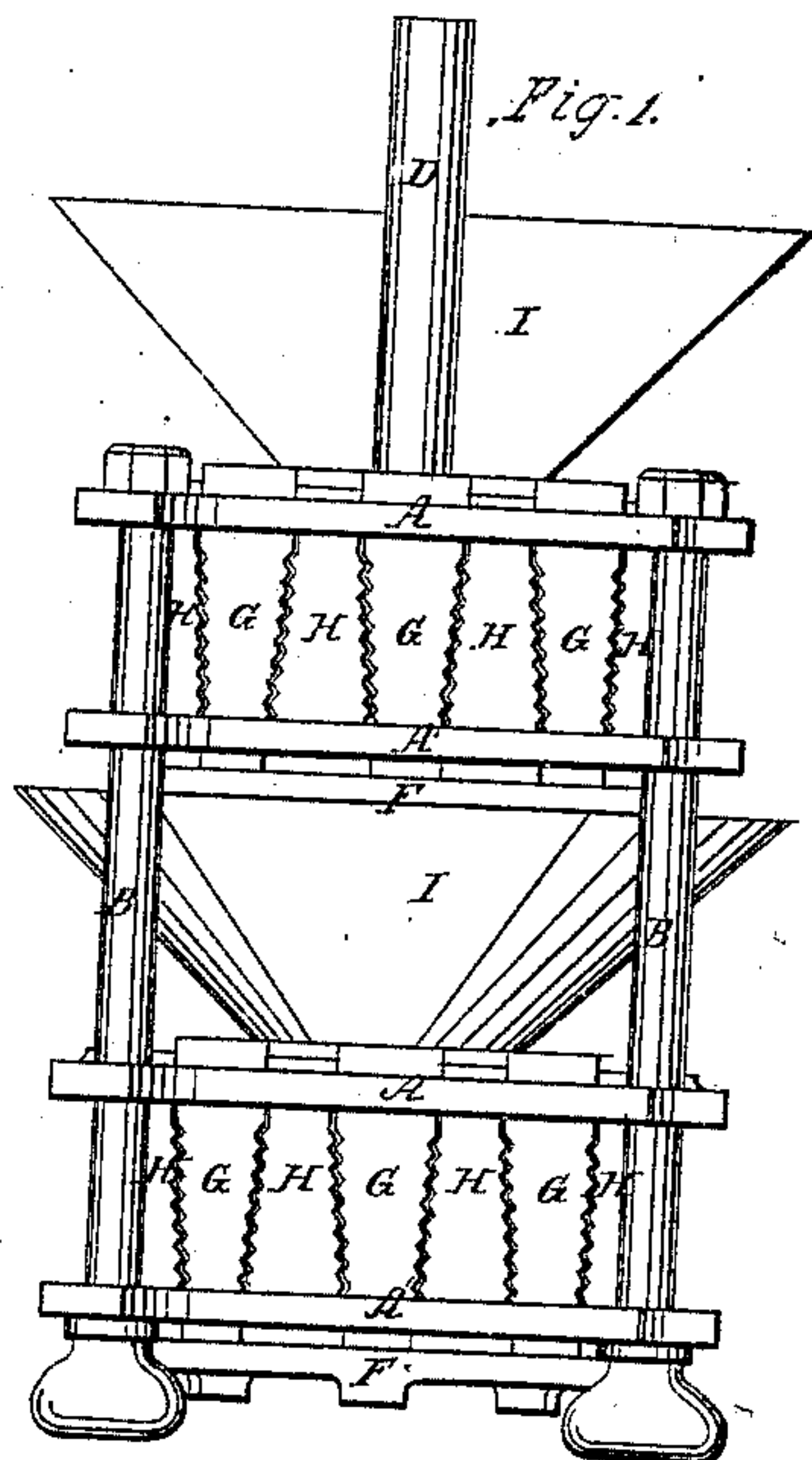


G. SANFORD.
MILL FOR GRINDING PAPER PULP.

No. 31,408.

Patented Feb. 12, 1861.



Witnesses.

Chas. Merrill
Henry J. Scriber

Inventor.

Gelston Sanford

UNITED STATES PATENT OFFICE.

GELSTON SANFORD, OF NEW YORK, N. Y.

MILL FOR GRINDING PAPER-PULP.

Specification of Letters Patent No. 31,408, dated February 12, 1861.

To all whom it may concern:

Be it known that I, GELSTON SANFORD, of the city, county, and State of New York, have invented a new and improved mill for the purpose of freeing vegetable fiber of its sap and all extraneous matter which adheres to it while in its natural state, and for reducing fibrous material to a pulp for paper-making, &c.; and I do hereby declare that the following is a clear and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference thereon, in which—

Figure 1 is an elevation. Fig. 2 is a vertical cut section through the center. Fig. 3 is a horizontal cut section through the center of the wings C and adjustable rubbers E. Fig. 4 is the under side of the top plate A. Fig. 5 is the flanged plate F, that screws up and down to vary the size of the apertures between the staves for grinding coarse or fine. Fig. 6 is the upper side of the plate A showing where the hopper I is inserted. Fig. 7 are the two kinds of staves the short one H has risers or bosses on its inner side which act as teeth in grinding or rubbing.

The two circular serrated plates A A' are secured to four or more standards B, with space between the standards to admit the wings C, which are secured to the shaft D, which passes through the center of the plates A, A'; and when set in motion causes the wings C to revolve.

To the wings C, are attached adjustable serrated rubbers E. The serrated rubbers E are attached to wings C, by a bolt and key, and are adjustable, so that if the face wears off, they can be brought up close again, which I find of great importance in mills for this purpose. Near the periphery of each plate A A' is a groove and mortises for securing wedge shaped fluted staves or grinding surfaces G, and H. The staves G, pass through mortises in plates A, A', and rest on the adjusting plate F, which by raising or lowering governs the fineness of the material ground as it is held in the shell until it is ground fine enough to escape between the staves G, and H. In grinding, two or more mills are used, and set in such

position that the products of one, escape to the one below it or next to it and so on throughout the whole. I have found the more friction used in preparing the pulp the better, as it imparts tenacity to the material, and for this purpose, I use two mills, one above the other, so that the material is subjected to a much longer continued series of manipulations, than could be done by one mill. In the upper mill I have projections on the staves, and the rubbers are coarser, than in the lower mill, for the reason, that, the upper mill is used to operate on the material in its crude state, the opening between the staves are wider than below, the lower mill has no projections on the lower staves; these are fluted, and the rubbers are finer, than in the mill above. By this arrangement, I take the material in its length of fiber long or short, and reduce it to pulp of a given consistency, when it descends to the mill below, where the process is continued, until it is fine enough to escape through the interstices in the lower shell. If but one mill were used, the finer portion of the pulp would escape first, but by my arrangement of two mills, it is all retained in the first, until it is all reduced to a given consistency, when it descends to the lower mill, where it is rubbed by a finer set of rubbers, and subjected to a longer continued process, and until it is fine enough to escape from the shell through the openings, between staves G, and H.

The staves H have projections or bosses at right angles to their length which come in contact with similar projections on the rubbers E. The wings C have projections or bosses on their edges which come in contact with projections on plates A A' for picking the material when in its coarse state.

For freeing green fiber of its extraneous matter remove some of the staves from two sides and feed the material through one half of the mill. When grinding a stream of water should pass through the mill. The hopper I is designed to feed the material to the mill to be ground.

I do not claim adjustable staves for they were secured to me by Letters Patent bear-

ing date the fourth day of January 1859,
but

What I do claim as my invention and desire to secure by Letters Patent is—

- 5 In mills for grinding paper pulp, constructing the sides of the mill of conical shaped staves with roughened surfaces, set alternately in reverse positions so that the

spaces between them can be adjusted as set forth in combination with the serrated rub- 10
bers E constructed and operating substantially as described.

GELSTON SANFORD.

Witnesses:

CHAS. MORRILL,

HENRY J. GREIBER.