

(No Model.)

3 Sheets—Sheet 1.

G. V. A. CUVIER, FILS & G. GOURAND.  
SORTING MACHINE FOR CLASSIFYING WOODEN STUFFS.

No. 347,264.

Patented Aug. 10, 1886.

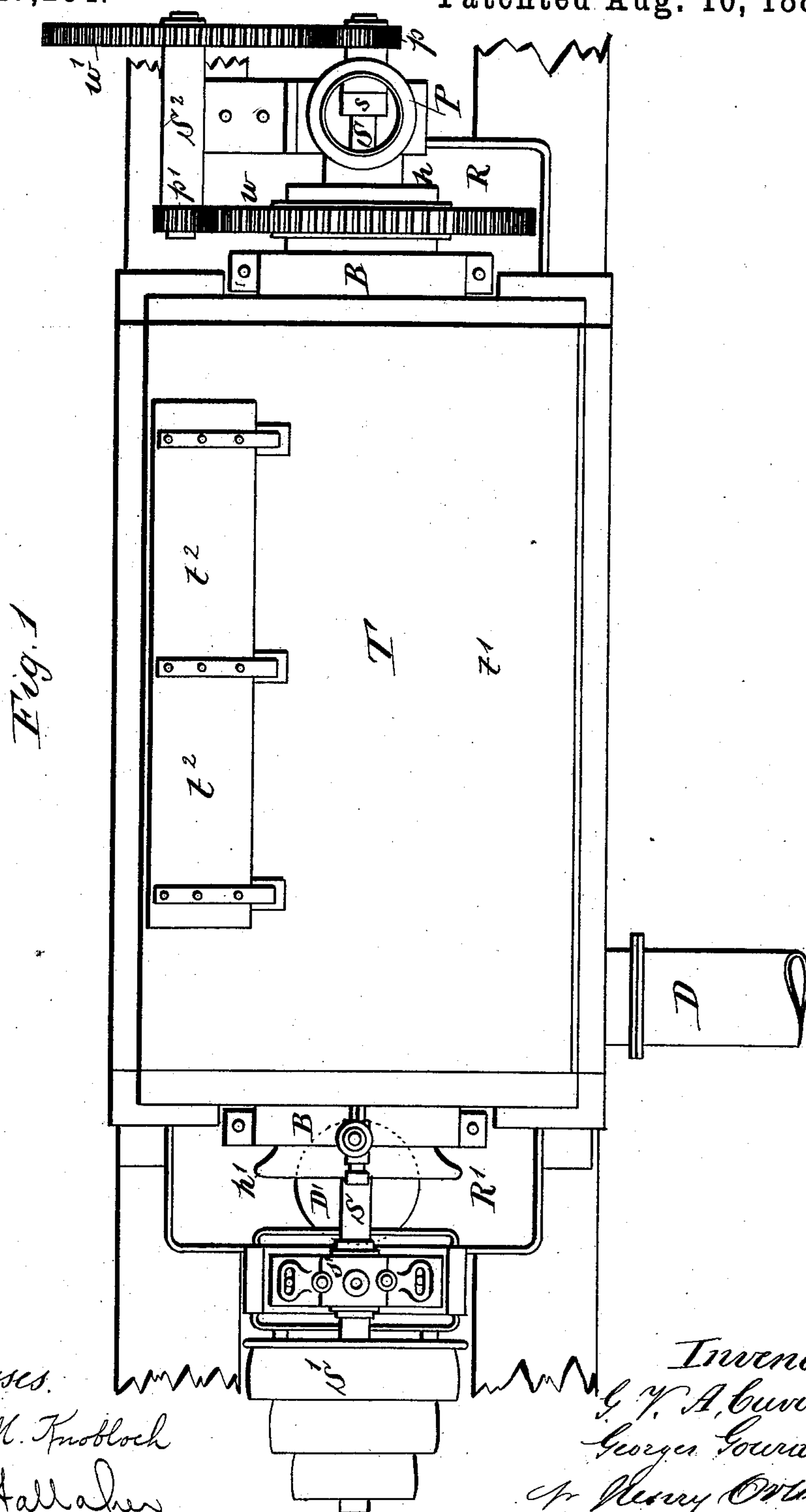


Fig. 1

Witnesses.

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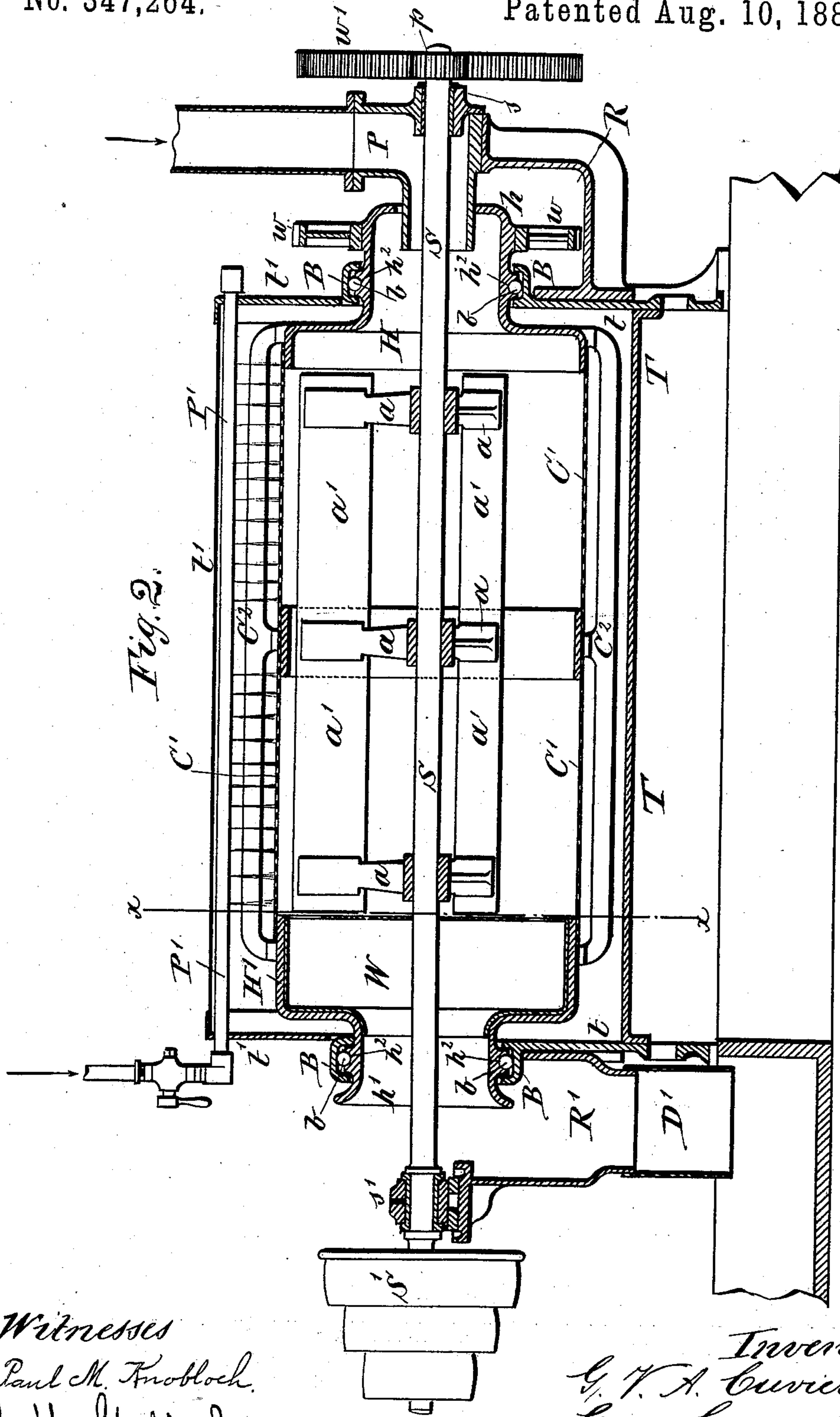
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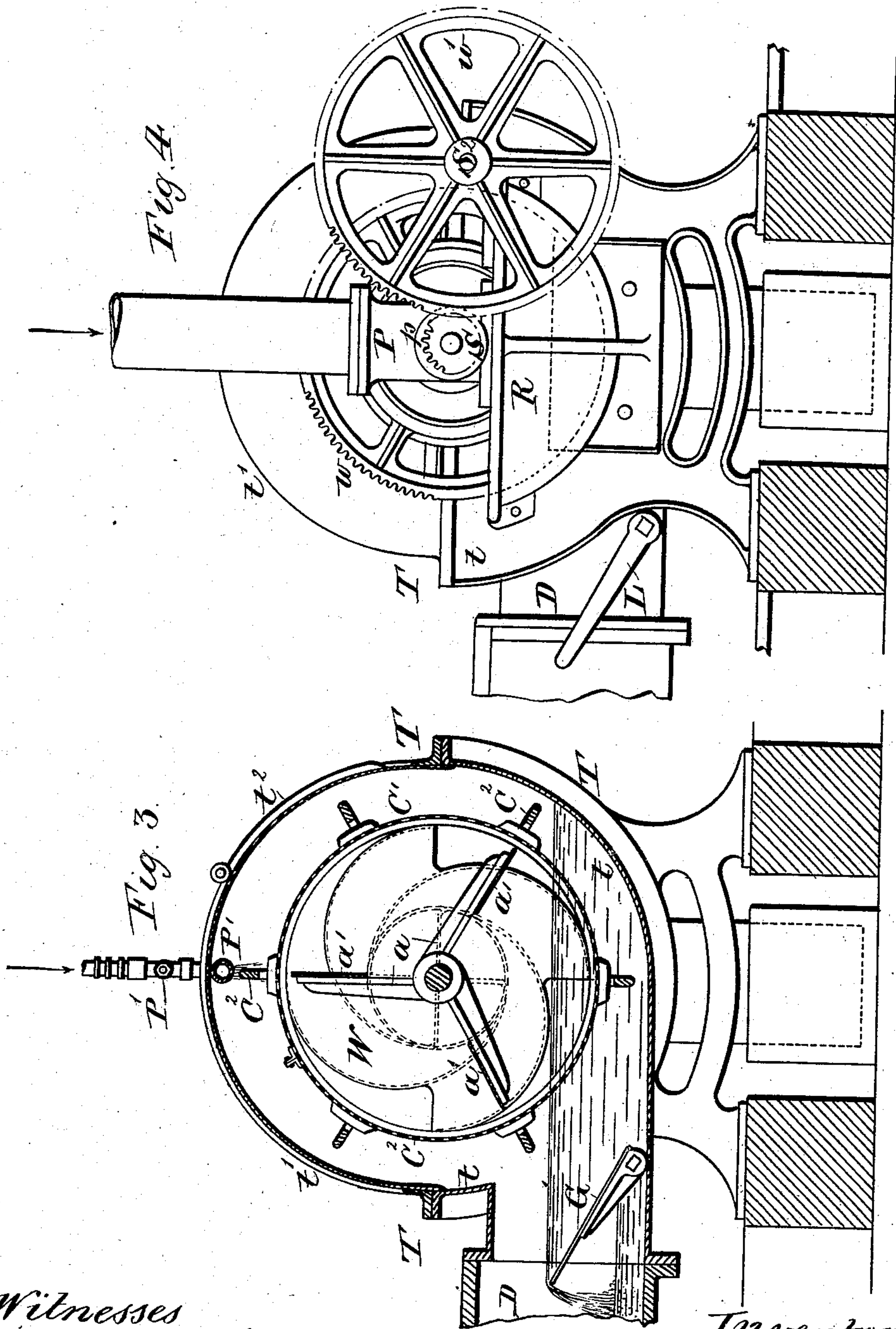
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# UNITED STATES PATENT OFFICE.

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## SORTING-MACHINE FOR CLASSIFYING WOODEN STUFFS.

SPECIFICATION forming part of Letters Patent No. 347,264, dated August 10, 1886.

Application filed May 10, 1886. Serial No. 201,731. (No model.)

*To all whom it may concern:*

Be it known that we, GUSTAVE VICTOR ABEL CUVIER, Fils, and GEORGES GOURAND, citizens of the French Republic, and residents of Selon-court, (Doubs,) in the French Republic, have invented certain new and useful improvements in a sorting-machine for classifying wooden stuffs or any other stuff intended for the fabrication of paper or any other manufacture; and we 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 machines for grading and classifying pulp according to the nature and quality of paper to be produced therefrom; and it consists, essentially, in devices whereby the grading or classification is effected by projecting the pulp suspended in water upon the inner surfaces of a slowly-rotating perforated cylinder by means of a rapidly-rotating agitator or agitators, thus combining centrifugal force with agitation to effect the classification, substantially as hereinafter fully described.

The invention further consists in the arrangement and combination of the mechanical devices and in combination therewith of means for preventing the meshes or perforations of the grading or classifying cylinder from becoming choked or obstructed by pulp, and for removing the graded or classified pulp, as well as the coarse pulp, from the apparatus, substantially as hereinafter fully described.

Referring to the accompanying three sheets of drawings, in which like letters indicate like parts wherever such may occur, Figure 1 is a top plan view; Fig. 2, a vertical axial longitudinal section; Fig. 3, a vertical transverse section on line  $x x$  of Fig. 2, and Fig. 4 a right end elevation of a machine for grading or classifying pulp embodying my invention.

The machine consists, essentially, of a vat or tank, T, of cylindrical form, preferably constructed in two sections,  $tt'$ , the upper section,  $t'$ , being secured to the lower section by means of bolts or a hinge-joint and bolts, so as to adapt

it for removal from said lower half for the purpose of gaining ready access to the grading or classifying cylinder or drum inclosed therein, for purposes presently explained. The upper or removable section is further provided with doors  $t^2$ , hinged thereto, as shown in Figs. 1 and 3, so that the mechanism contained in the tank may be readily inspected and its condition ascertained.

The vat or tank has a lateral conduit or discharge duct, D, from which the graded or assorted pulp is discharged, and in said duct is arranged a valve or gate, G, adapted to be set by means of a hand-lever, L, to regulate the level of the water in the tank T, as shown in Figs. 3 and 4.

At each end the tank T is provided with box or grooved bearings B, for purposes to be described hereinafter.

C is the grading or sorting cylinder, that is composed of two heads, H and H', Fig. 2, a body of perforated sheet metal or wire-cloth, C', and of stirrer or agitator blades C<sup>2</sup>. The head H has a tubular extension,  $h$ , and the head H' has a like bell-mouthed extension,  $h'$ . Both tubular extensions  $h$  and  $h'$  are provided with annular grooved flanges  $h^2$ , that fit in the bearing boxes or grooves B of the tank T, and form seats for ball-bearings  $b$ , for the purpose of reducing friction. Instead of ball-bearings any other suitable rotary bearing may be provided—as, for instance, rollers may be employed and pivoted loosely upon a suitable bearing-ring secured to the tank T, or in suitable standards, as will be readily understood.

At the right end of the tank is secured a semi-cylindrical receiver, R, Figs. 2 and 4, that supports the feed-pipe P, in which is formed one of the bearings,  $s$ , for a shaft, S, that has its other bearing,  $s'$ , at the opposite end of the machine on a like receiver, R', which is connected to a discharge duct or trough, D', into which the coarser pulp is discharged, as will presently appear.

The head H' of the cylinder C forms a casing for a fluid-elevator, which may be a bucket-wheel, or, as shown, a tympanum-wheel, W, Fig. 3, that elevates the coarser pulp mixed with or suspended in water and discharges it axially through the bell-mouth extension  $h'$  into the receiver R'.



Upon the shaft S is mounted an agitator, A, composed of radial arms  $\alpha$  and agitator-blades  $\alpha'$ . At its left end the shaft carries a step-pulley, S', Figs. 1 and 2, for varying its speed, and on its right end a pinion,  $p$ .

The cylinder and shaft are rotated at different speeds by gearing, which consists of the gear-wheel  $w$  on extension  $h$  of cylinder-head H, a pinion,  $p$ , on shaft S, a gear-wheel,  $w'$ , and a pinion,  $p'$ , on counter-shaft S', Figs. 2 and 4, the wheel  $w$  meshing with pinion  $p'$ , and the pinion  $p$  with wheel  $w'$ , as shown.

The operation of the machine is as follows: The pulp to be sorted, mixed with or held in suspension in water, is fed to the apparatus through the feed-pipe P after the valve or gate has been set to maintain the level of the fluid compound or "pulp solution," if we may so term it, at the proper height, said level varying with the condition of the pulp and the degree of fineness of the pulp to be obtained. The shaft S is now rotated from any suitable prime motor through the belt-pulley S', thereby rotating the cylinder C through the pinion  $p$ , gear-wheel  $w'$ , pinion  $p'$ , and gear-wheel  $w$ , the speed for ordinary purposes being about ten to twelve rotations per minute for the cylinder and from one hundred and eighty to two hundred for the shaft S, which speed may be varied within certain limits by shifting the driving-belt on the belt-pulley S'. In this manner the agitator A is rotated at a considerable speed comparatively with that of the cylinder C, thereby keeping the pulp in a state of subdivision and at the same time projecting it upon the inner perforated periphery of the cylinder with great velocity and force, the centrifugal action assisting the tangential forces in passing the pulp through the meshes or perforations of the cylinder. To prevent these from becoming choked up with pulp, we arrange above the cylinder C, within the casing or tank T, a pipe, P', from which jets of water, under pressure, are forced upon the perforated portion of the periphery of the cylinder, to clear its perforations or meshes, as shown in Figs. 2 and 3. As the pulp passes through these meshes or perforations, it is collected in the bottom of the tank and prevented from settling by the agitator-blades C' on cylinder C, and as the level rises in the tank the surplus water and pulp flow out over the valve or gate G, as shown in Fig. 2. The coarser pulp that cannot pass through the meshes of the cylinder is taken up by the tympanum and discharged for further reduction, as above described. When it is desired to change the cloth or perforated metallic shell or body C' of the cylinder C for one coarser or finer, the upper half,  $t'$ , of the tank T is removed, the cloth removed from the cylinder and another

substituted. For purposes of inspection of the interior of the tank T, the door  $t^2 t^2$  is opened. If by accident the valve should be set to cause the level of the liquid to rise and flow out of the tubular extension  $h$  of the head H of said cylinder, such liquid would not run to waste, as it would be collected in the receiver R, from which it may be removed afterward, thus ensuring against a waste of pulp by reason of an overflow.

If desired, the cylinder C may be arranged on an inclined plane, instead of a horizontal plane, as shown. This may be found of advantage in grading or sorting the coarser grades of pulp when a more rapid flow of the material through the machine may be desirable.

Having now described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In a machine for sorting or grading pulp, the combination, substantially as described, with a revolving pulp-strainer and an elevating-wheel arranged within and revolving with the strainer, of an inclosing tank or vessel, and an adjustable overflow-valve therefor, substantially as and for the purpose specified.

2. In a machine for sorting or grading pulp, a slowly-rotating perforated grading-cylinder in combination with a rapidly-rotating agitator or beater arranged within the cylinder, and a jet-pipe arranged above said cylinder to deliver water in jets and under pressure upon the periphery thereof, substantially as and for the purpose specified.

3. In a machine for sorting or grading pulp, an inclosing tank or vessel provided with an adjustable overflow gate or valve, in combination with a perforated grading-cylinder rotating within said tank and a beater or agitator rotating within the cylinder, as described, for the purpose specified.

4. The tank T, constructed in two sections, detachably connected together, and provided with the receptacle R', and the cylinder C, arranged to rotate within the tank and having a feed-pipe at one end and a discharge pipe or spout at the other emptying into said receptacle R', in combination with the shaft S, carrying a water-elevator arranged to discharge into the discharge-spout of the cylinder, and the shaft S', gearing  $w w'$  and  $p p'$ , substantially as and for the purpose specified.

In testimony that we claim the foregoing we have hereunto set our hands, this 22d day of September, 1885.

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Witnesses:

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ÉMILE MICHEL.