(No Model.) 4 Sheets—Sheet 1.

R. D. GATES.

PULVERIZING MACHINE.

No. 270,217. Patented Jan. 9, 1883.

Fig 1.

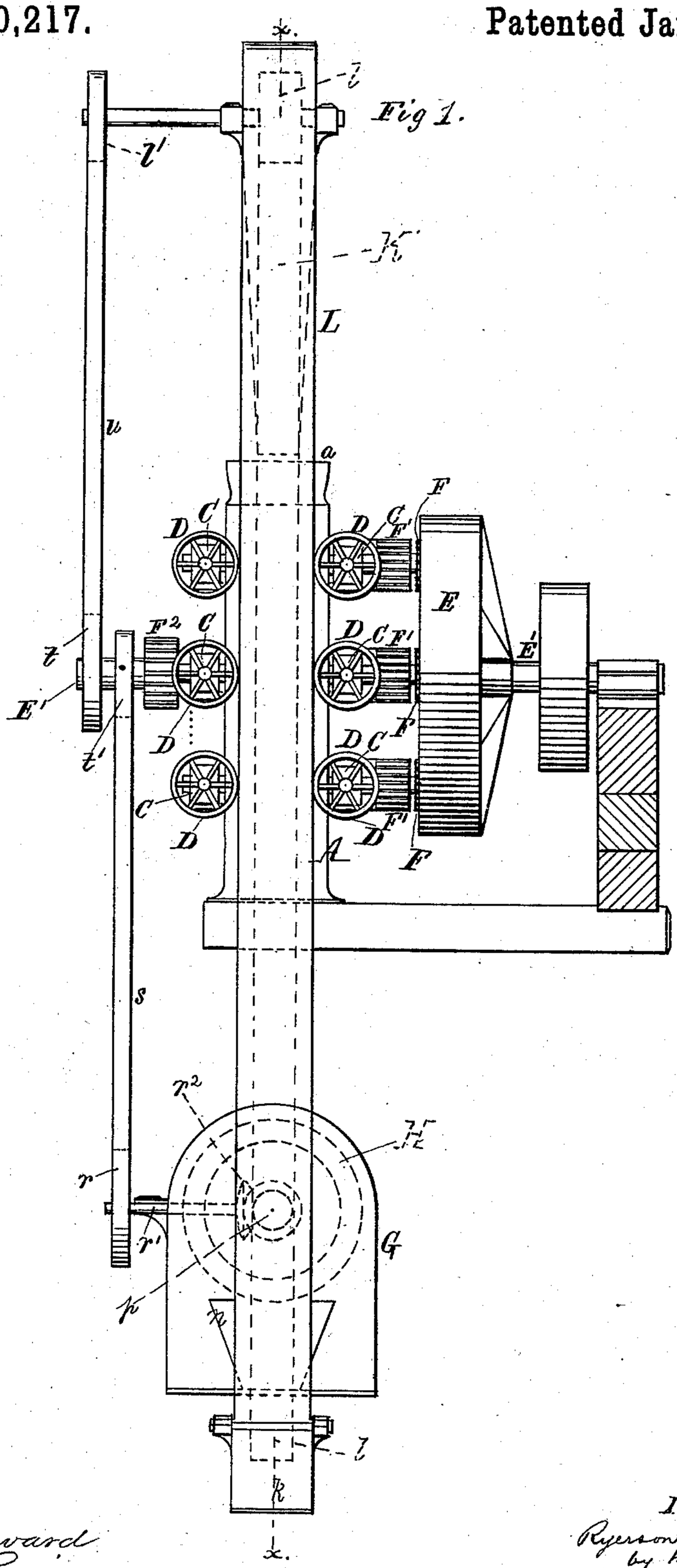

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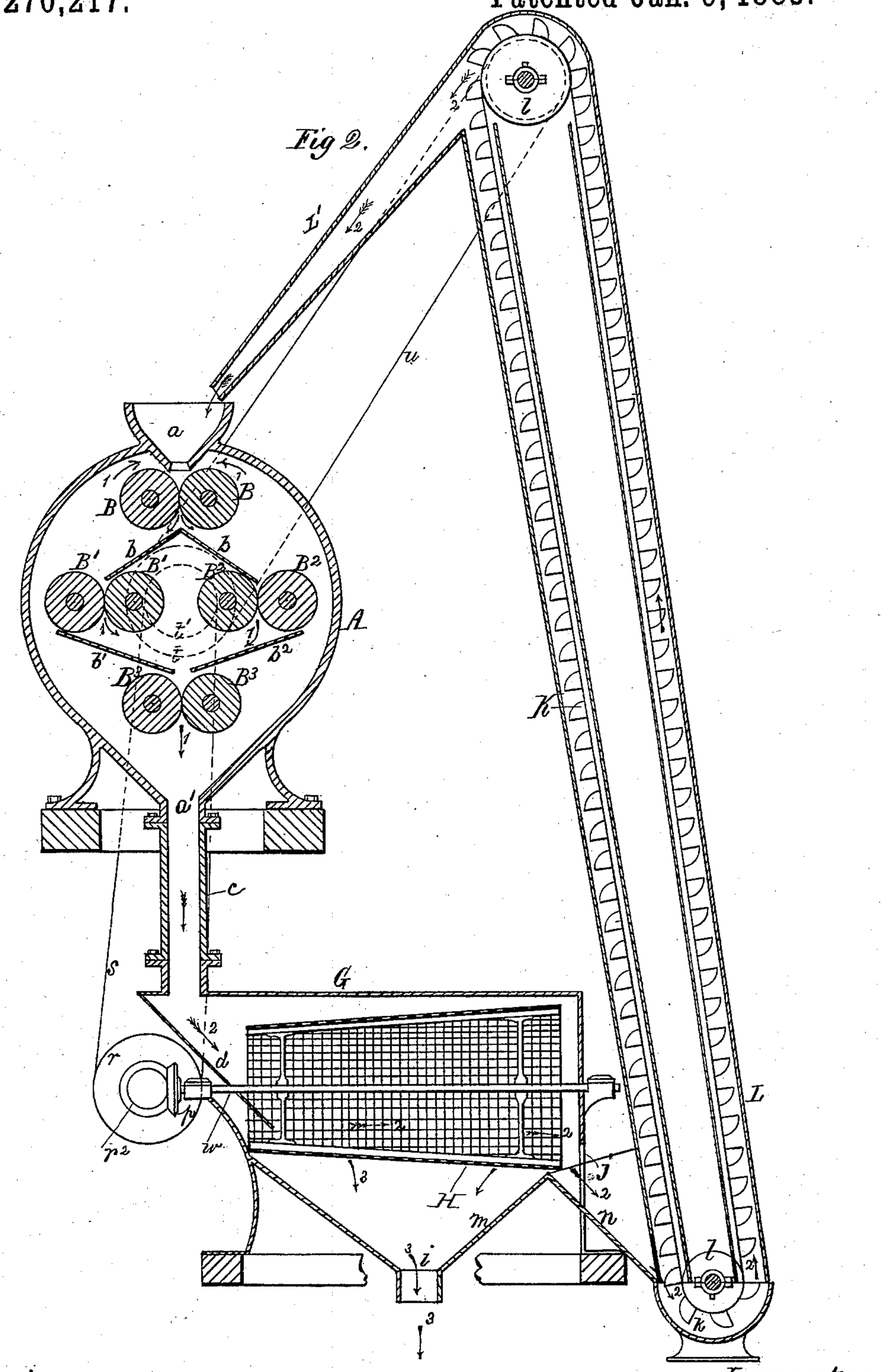
Fig 2.



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PULVERIZING MACHINE.

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Fig 3.

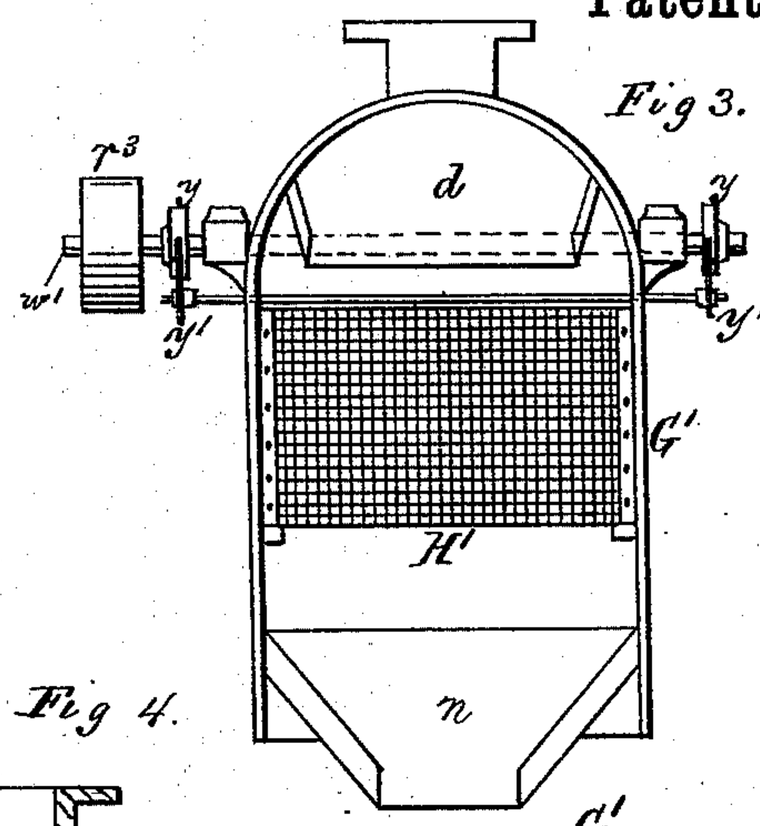

Fig 4.

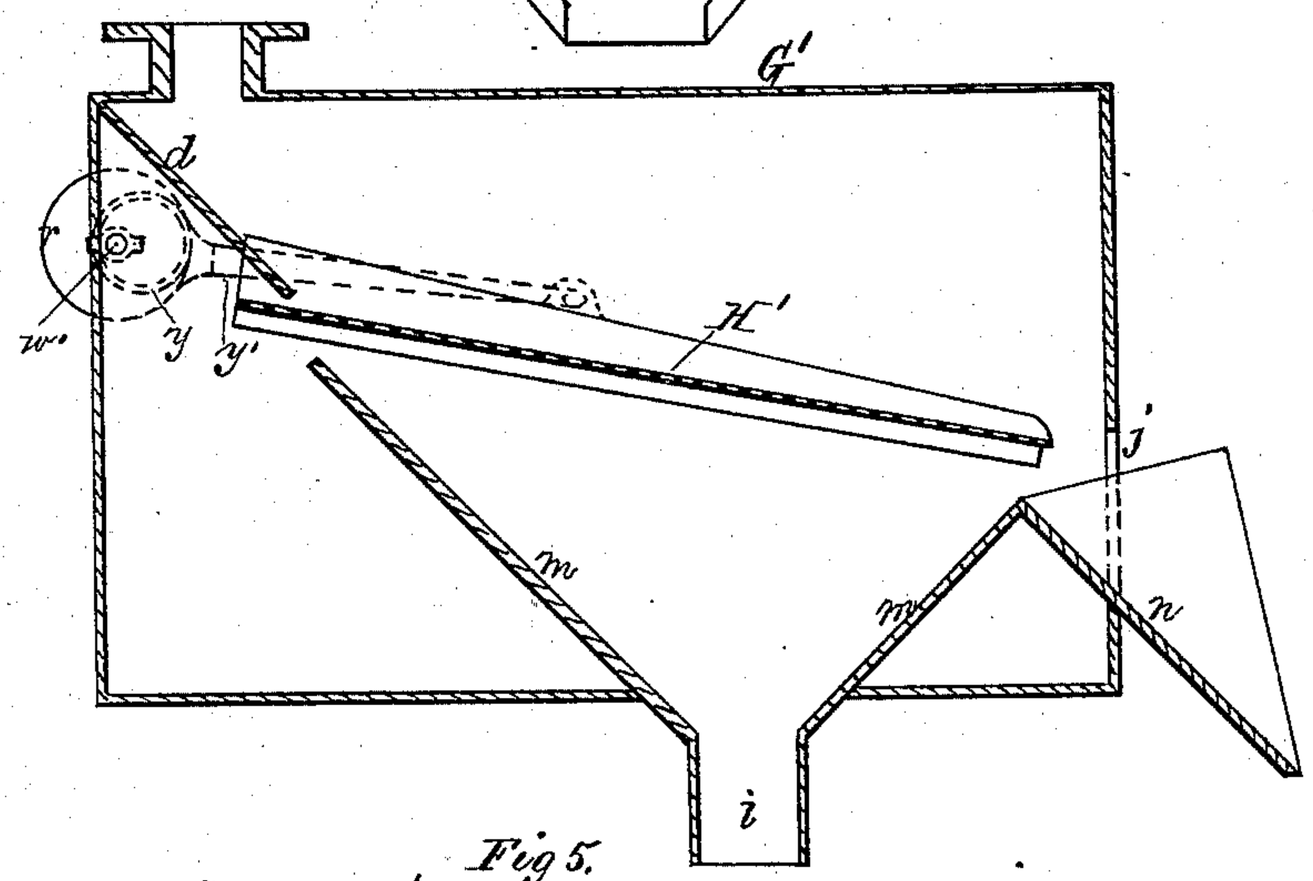

Fig 5.

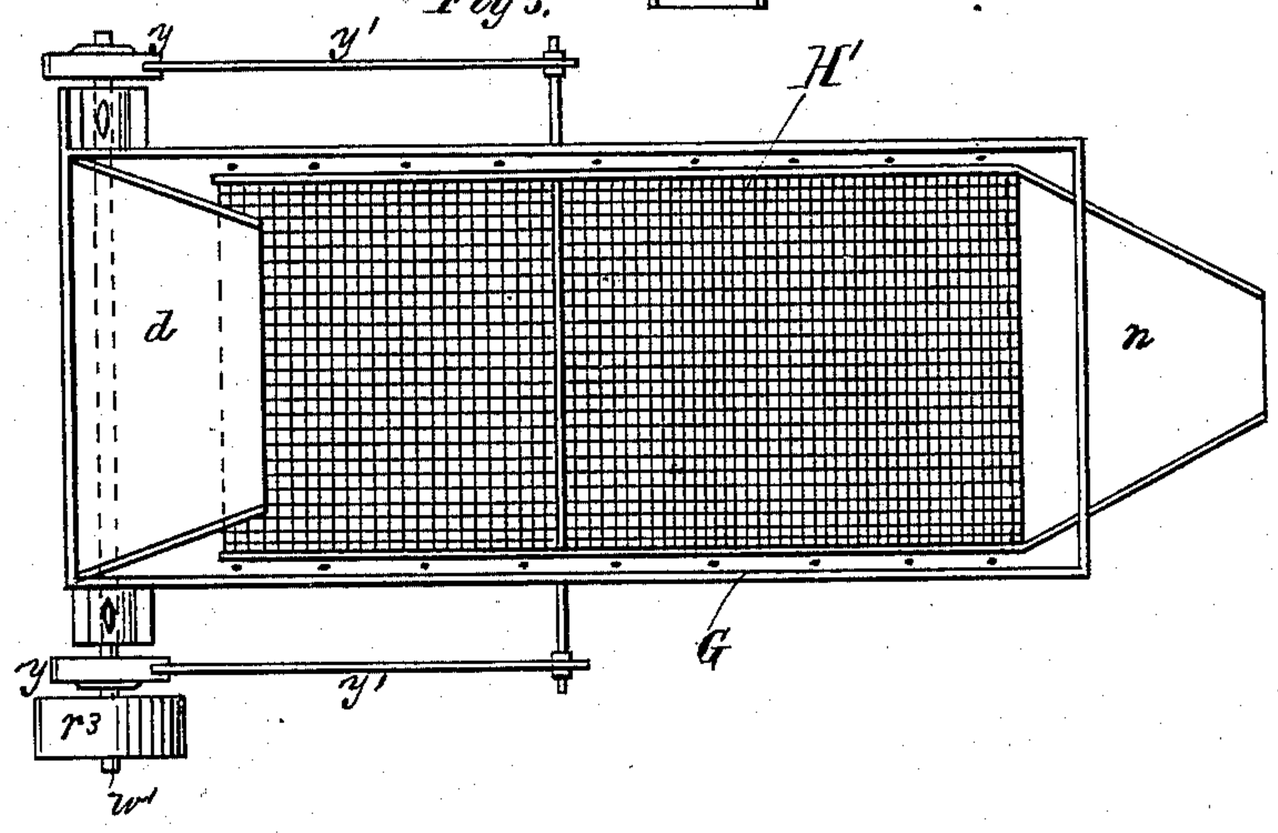

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Fig 6.

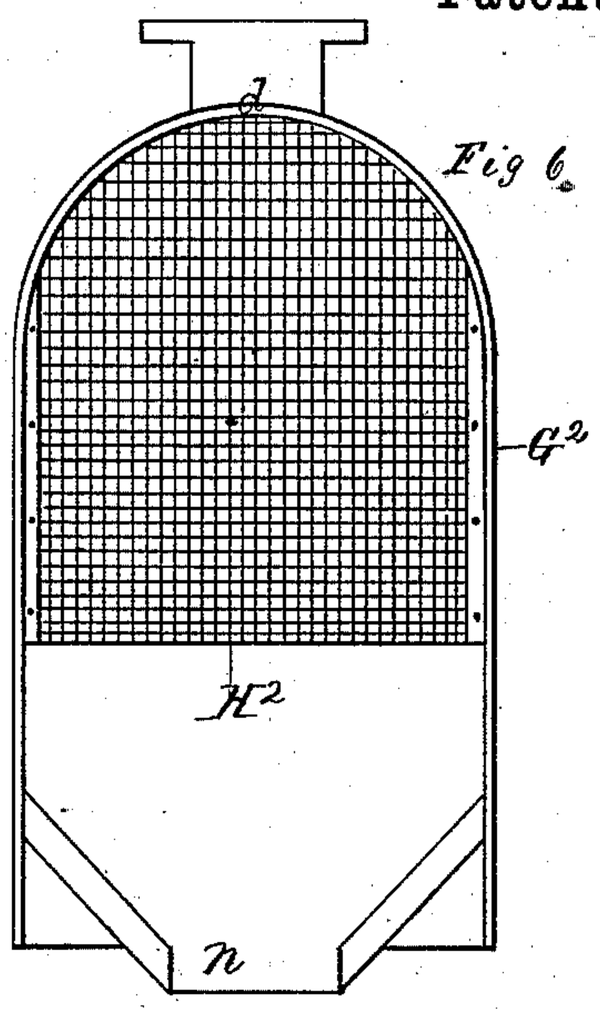


Fig 7.

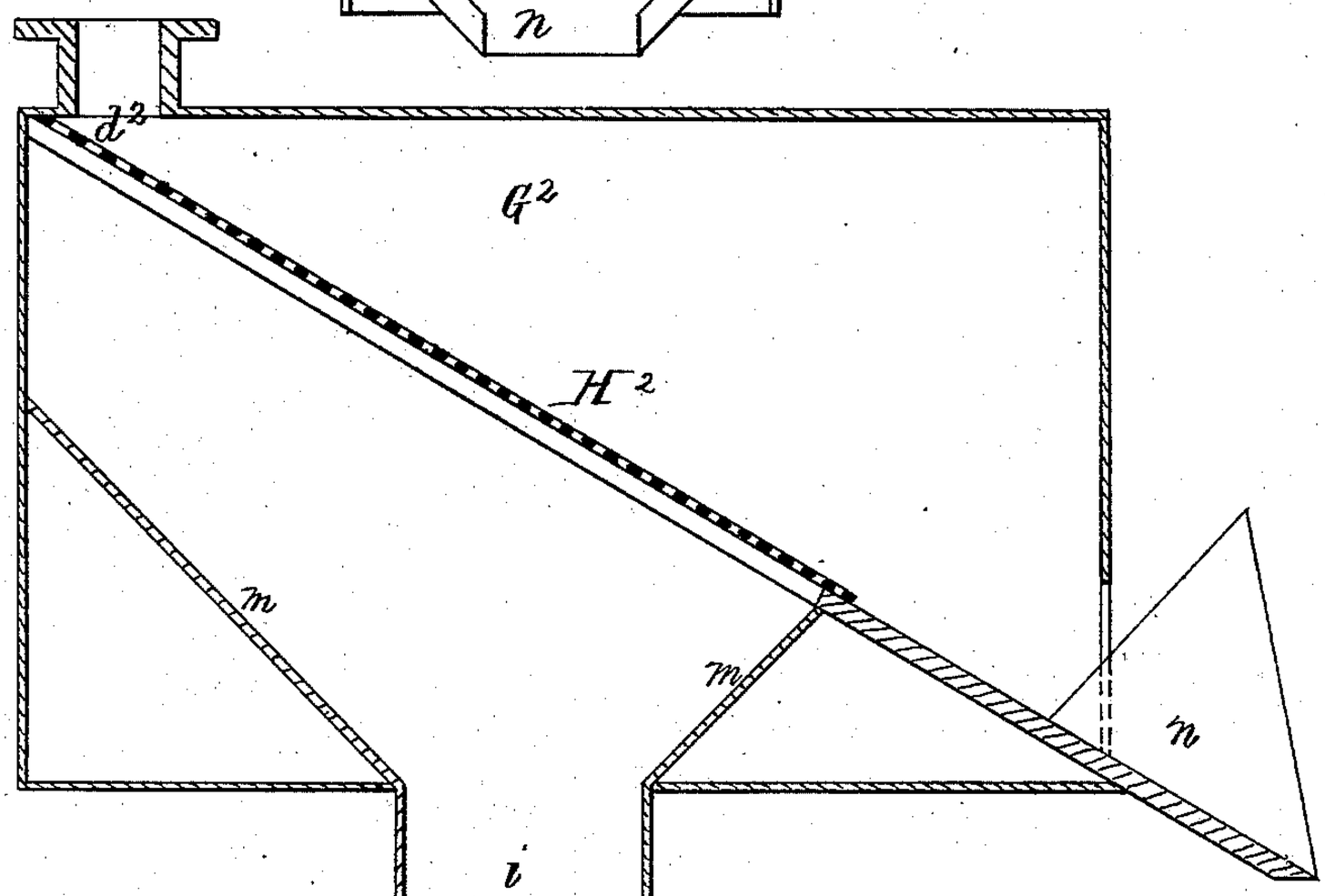
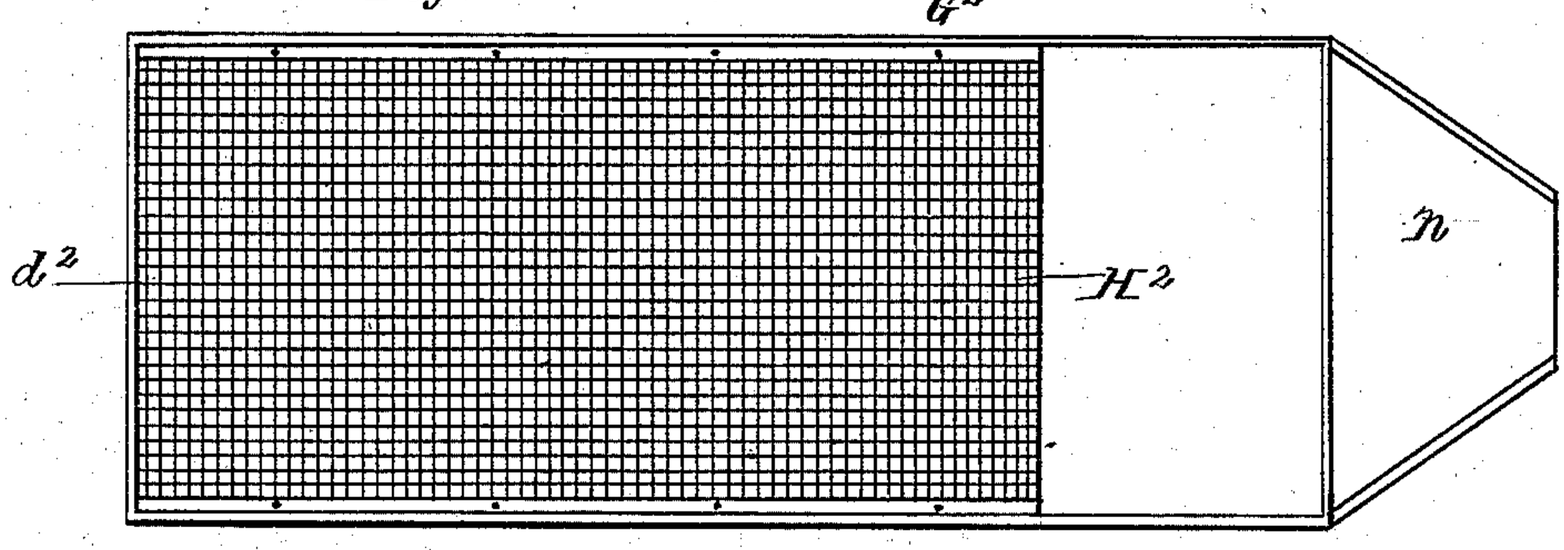


Fig 8.



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UNITED STATES PATENT OFFICE.

RYERSON D. GATES, OF CHICAGO, ILLINOIS.

PULVERIZING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 270,217, dated January 9, 1883.

Application filed August 10, 1882. (No model.)

To all whom it may concern:

Be it known that I, RYERSON D. GATES, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Pulverizing-Machines, of which the following is a specification.

My invention relates to a pulverizing-machine comprising pulverizing-rollers, a toothed driving-wheel, pinion gear-wheels on the shafts of the rollers, an external surrounding and inclosing case, inclosed external separating-screen, inclosed elevator, and means for operating the said screen and elevator, as will be hereinafter described and claimed.

In the accompanying drawings I have represented four pairs of pulverizing-rollers inclosed within a cylindrical case, and these rollers are revolved in the directions indicated by the arrows 1, by means of gearing which is specially described and claimed in another application for patent filed by me in the United States Patent Office on the 7th day of August, 1882; or they may be revolved in the directions indicated by any other suitable gearing—for instance, by the gearing shown in Letters Patent No. 260,092, dated June 27, 1882, issued to me.

In the accompanying drawings, Figure 1 is an edge or end elevation of my improved pulverizing-machine complete. Fig. 2 is a vertical section of the same in the line *x x* of Fig. 1. Figs. 3, 4, and 5 show a front longitudinal section and a plan view of a modified form of screen-case and screen which may be employed in lieu of the screen-case and revolving screen shown in Figs. 1 and 2; and Figs. 6, 7, and 8 also show a front view, longitudinal section, and plan of another form of screen-case and screen which may be used in lieu of either of the forms shown in the other figures of the drawings.

The inclosing-case A may be constructed in cylindrical form, and is provided with a feed-opening, *a*, at top, and a discharge-opening, *a'*, at bottom. The heads of the case may be removable and confined to the cylindrical part by screw-bolts; or the case may be formed of two half-sections, the same as in my aforesaid Patent No. 260,092. Within the case A one, two, three, or more pairs of grinding or pulverizing rollers, B B' B² B³, are applied, and between the three pairs B B' B² a parting chute-plate or sieve, *b*, of angular form, is applied, while between the three pairs B' B² B³ two inclined chute-plates or sieves, *b' b²*, are provided. The shafts of the rollers are supported in bearings C, which are applied upon brackets of the case, and are provided with spring-pressure and screw-adjusting appliances D, similar to those shown and described in my aforesaid pending application, or those shown in my Patent No. 260,092; or they may be provided with any other appliances for the same purpose.

The gearing, consisting of an internally-toothed wheel, E, having a shaft-supporting spider within it, and pinion-wheels F F' F², for driving the several pairs of rollers in the directions indicated by the arrows 1, will be the same as shown in my aforesaid pending application, and therefore need not be particularly described here. The illustrated motions of the rollers may be produced in any other suitable manner without departing from the invention which I claim under this application.

To the bottom of the cylindrical case A a separating or screen case, G, is coupled by a tube, *c*, or other suitable means. This case is provided with a chute-board, *d*, and a revolving tapering screen, H. It also is formed with an inclined discharging-bottom, *m*, having a passage, *i*, through it, and with a passage, *j*, in its end opposite the receiving end, and beneath this passage *j* a chute, *n*, is provided.

L is an elevator-spout, provided with a hopper, *k*, at its lower end, which communicates with the chute *n*, as indicated by the arrow 2. This elevator-spout has an endless elevator, K, of usual construction, applied within it, as shown, and it is provided with an inclined conducting-chute portion, L', which leads into the hopper-like formation around the opening *a* of the cylindrical case A, as shown. The elevator-belt, which is passed around pulleys *l l*, is revolved by a belt, *u*, which passes around the pulley *l'* of the upper shaft of elevator-spout, and around a pulley, *t*, of the main shaft E', while the revolving screen is revolved by a belt, *s*, which passes around a pulley, *t'*, of said main shaft and around a pulley, *r*, of a shaft, *r'*. The shaft *r'* has a bevel-wheel, *r²*,

on one of its ends, and this bevel-wheel gears with another bevel-wheel, *p*, on the shaft *w* of the revolving screen.

Instead of employing the revolving screen H, a screen-case, G′, with a reciprocating screen, H′, may be applied between the elevator-spout and the cylindrical case A. The screen-case G′ will be provided with a chute-board, *d*, inclined discharging-bottom *m* having passage *i* in it. It will also be provided with a passage, *j*, and chute *n*, as shown; but instead of the screen being revolved by a belt passed over the pulley-shaft it will be reciprocated by an eccentric, *y*, and connecting-rod *y′*, set in motion by a belt, *s*, passed around a pulley, r^3, of a shaft, *w′*, having the eccentric applied to it; and, if desired, a screen-case, G^2, similar to the one shown in Figs. 1, 4, and 7, may be provided with a stationary screen, H^2, which answers as a chute, at d^2.

In operating with my improved pulverizer the substances are fed in at *a*, and conducted between the rollers and caused to descend into the revolving screen H, or upon the screen H′ or H^2, as indicated by the arrows 2. The finely-pulverized substances are screened through the meshes of the screen and pass into suitable receptacles, as indicated by the arrows 3, while the partially-ground or unpulverized substances pass out of the end of the screen upon the chute *n* into the hopper *k*, and are elevated by the elevator K and deposited again into the cylindrical case, and again passed between the rollers and over the surface of the screen H. Thus my pulverizer insures fine grinding of all the substances which pass through its rollers and the meshes of the screen H; and the construction is such that the machine can be operated rapidly without any liability of clogging the screening-surface.

The external screen may be employed between the roller-inclosing case and the elevator without being inclosed or surrounded by the separating-chamber, there being proper conducting chutes or spouts provided for conveying the substances into and out of or upon and off the screen. I, however, regard the separating-chamber a very useful adjunct of the screen.

I have represented four pairs of pulverizing-rollers in the drawings; but I do not confine myself to this number, as a different number of pairs may be employed. If one pair only is used, the chutes or screens within the outer case may be omitted; but if a plurality of pairs of rollers be adopted chutes or screens will be provided within the outer case for conducting the substances from one pair of rollers to another pair.

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

A pulverizing-machine comprising a toothed driving-wheel, a plurality of pulverizing-rollers, pinion gear-wheels on the shafts of the rollers, an external surrounding and inclosing case for the rollers, inclosed external separating-screen, inclosed elevator, and suitable means for operating said screen and elevator, substantially as and for the purpose described.

RYERSON D. GATES.

Witnesses:
E. O. HASTEN,
HARRY LAIRD.