

(No Model.)

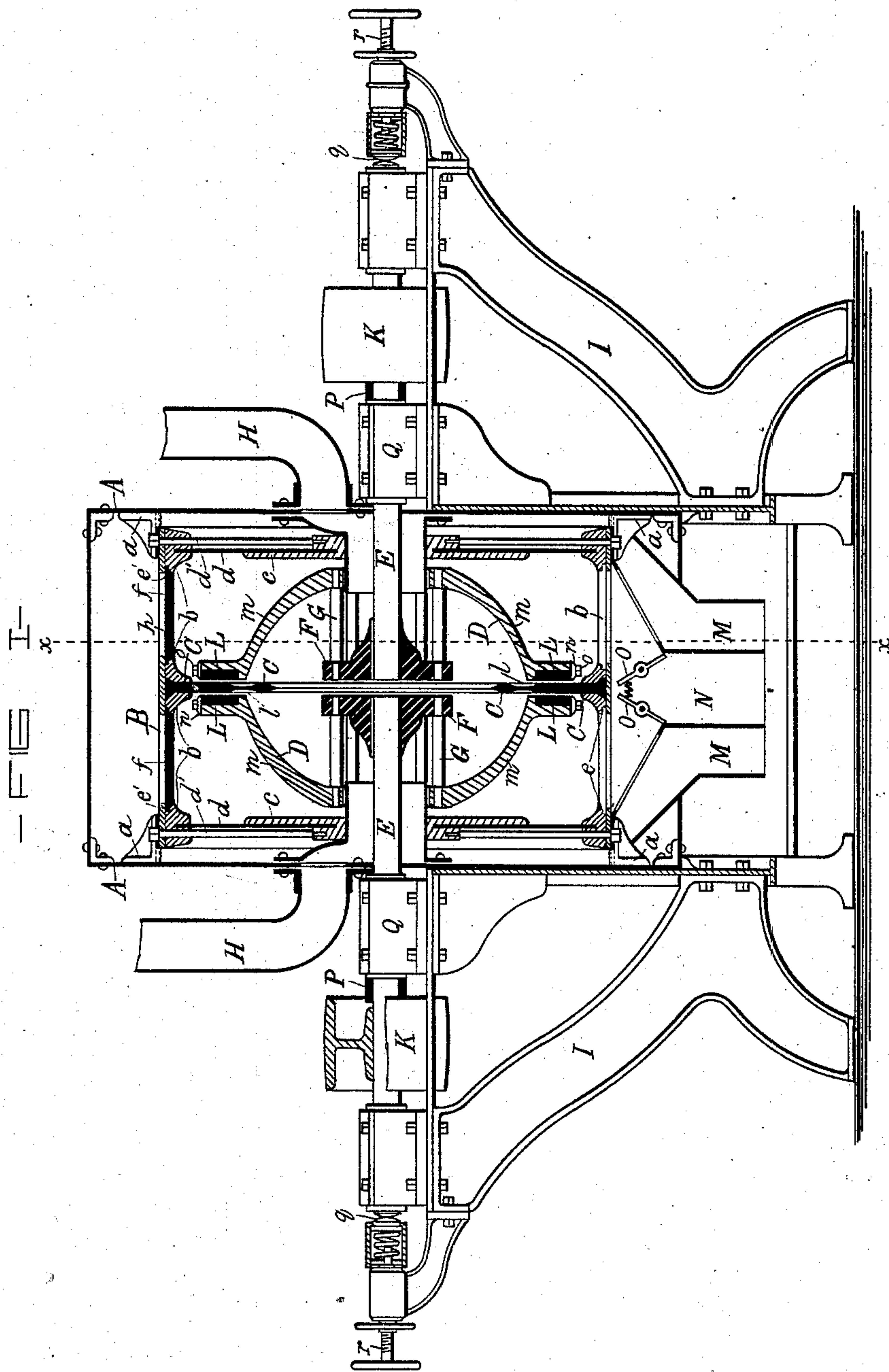
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R. H. MINISTER.

GRINDING AND DECORTICATING MILL.

No. 284,466.

Patented Sept. 4, 1883.



—WITNESSES—

Dani Fisher
Charles H. Night

—INVENTOR—

Robert H. Minister,
by G. H. Howard,
Atty.

(No Model.)

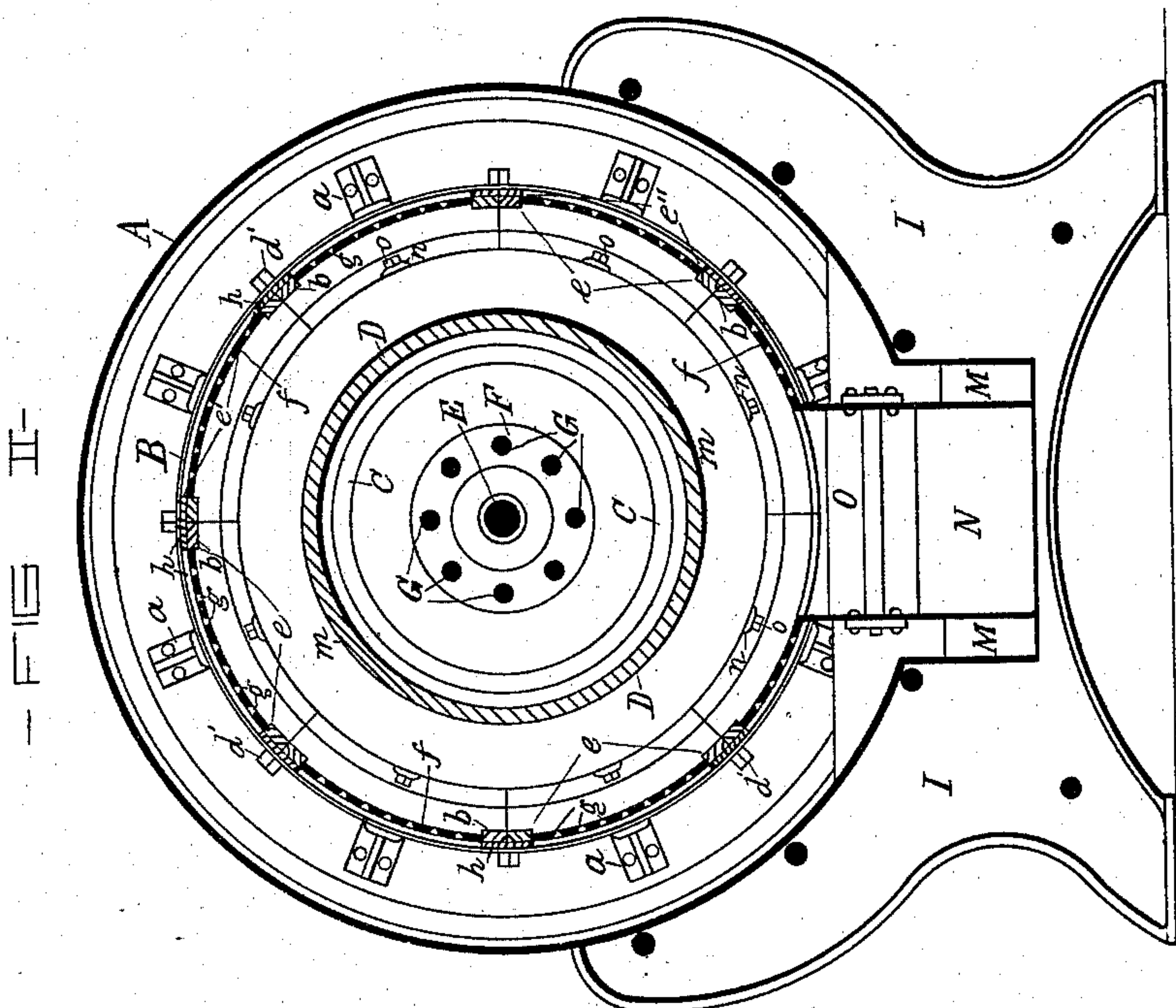
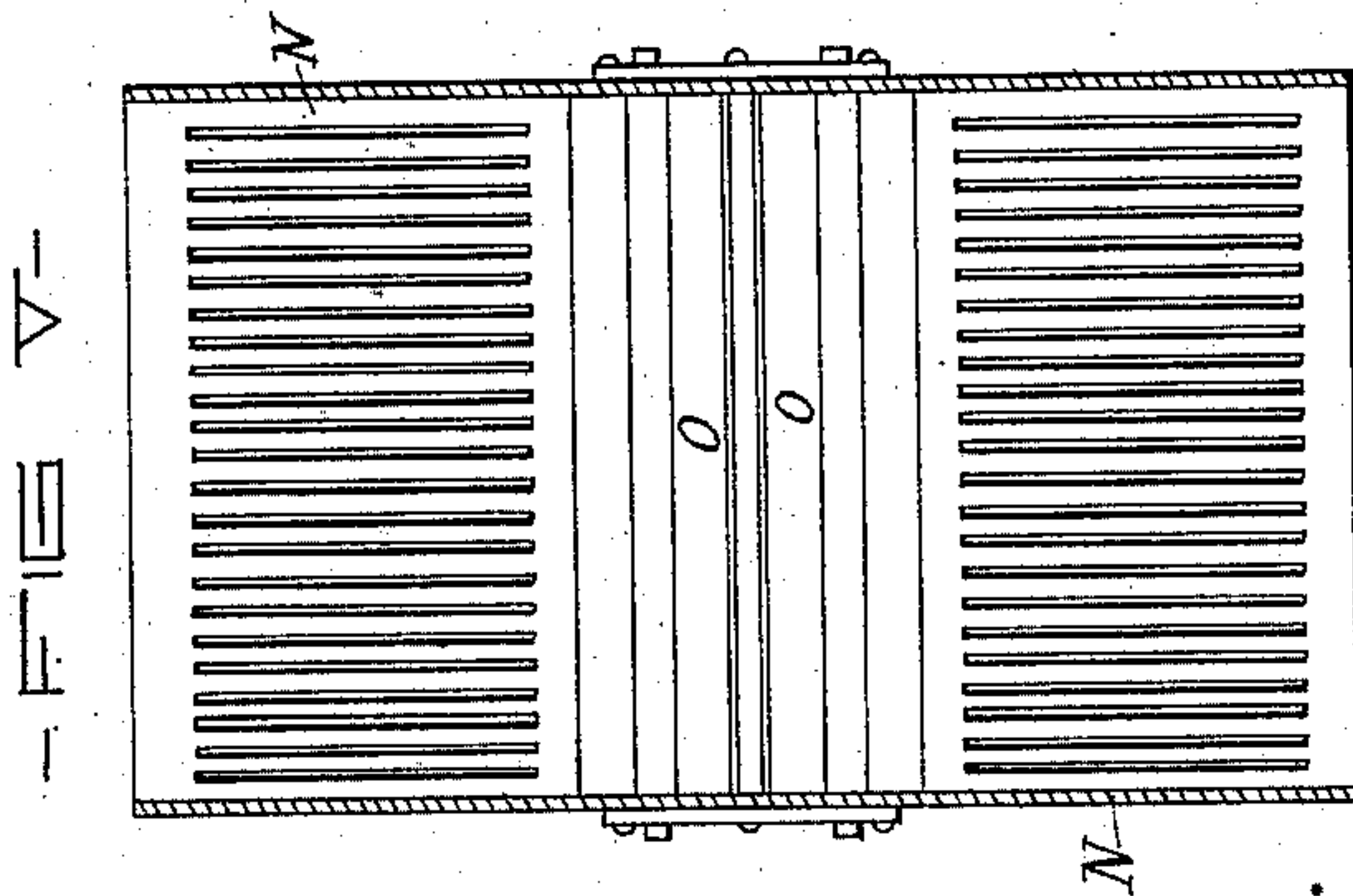
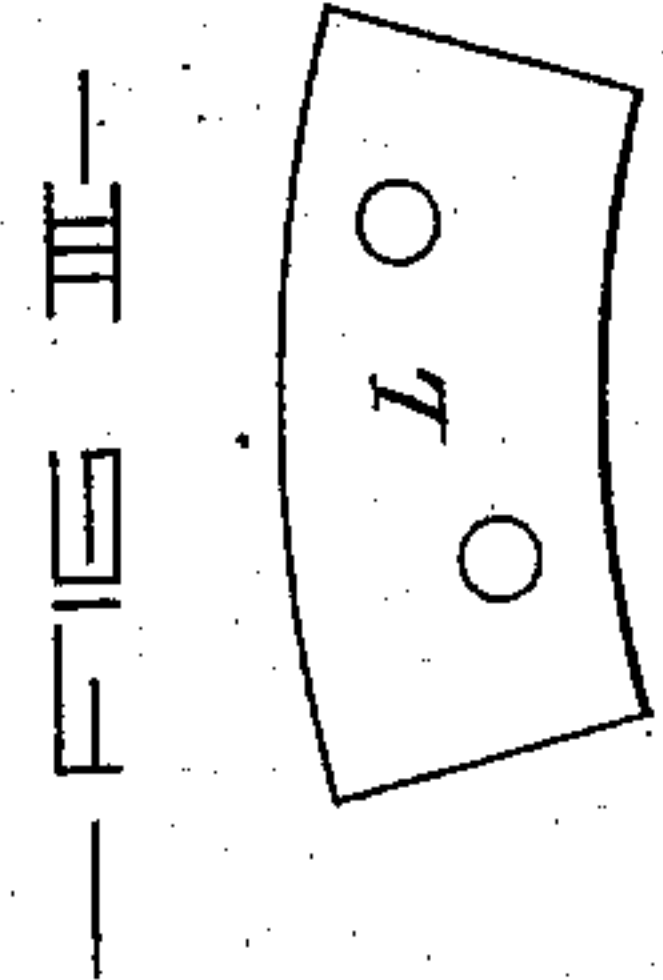
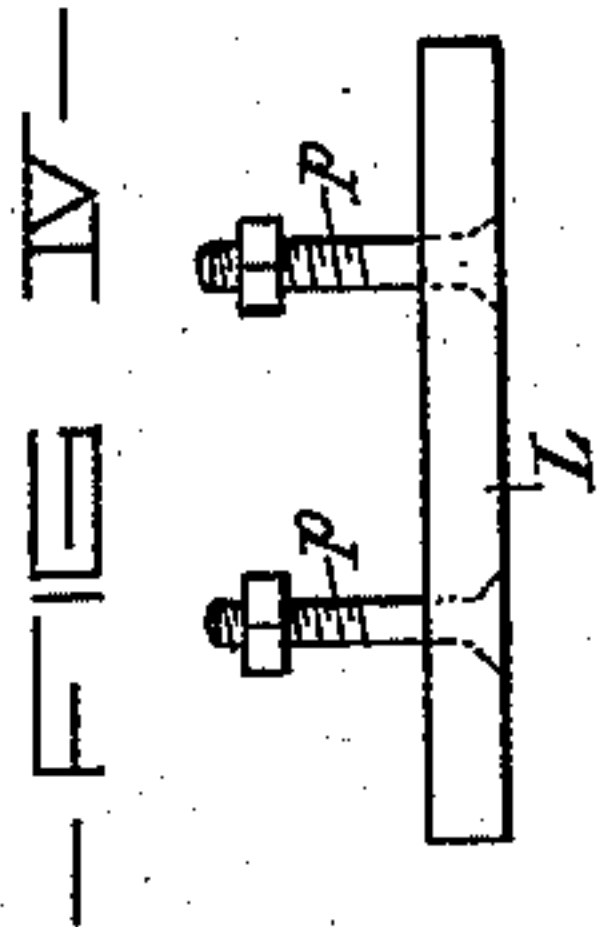
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R. H. MINISTER.

GRINDING AND DECORTICATING MILL.

No. 284,466.

Patented Sept. 4, 1883.



—WITNESSES—

Paul Fisher
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(No Model.)

3 Sheets—Sheet 3.

R. H. MINISTER.

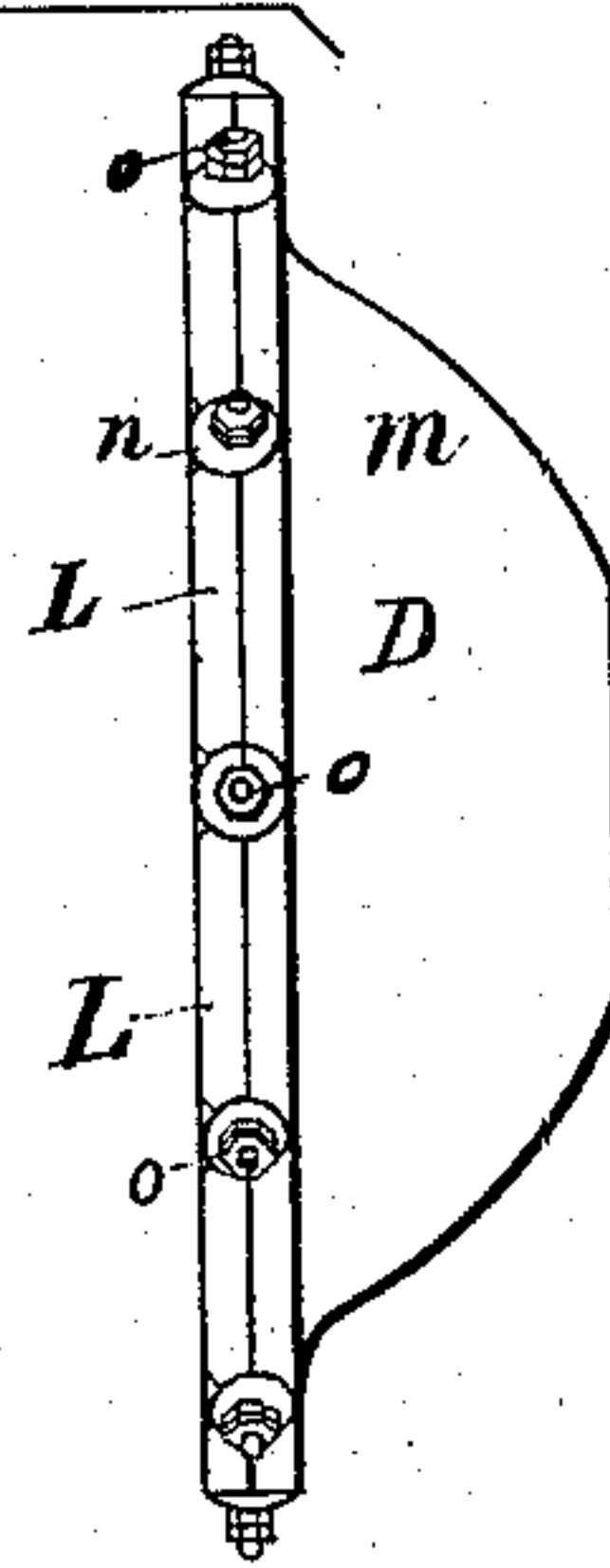
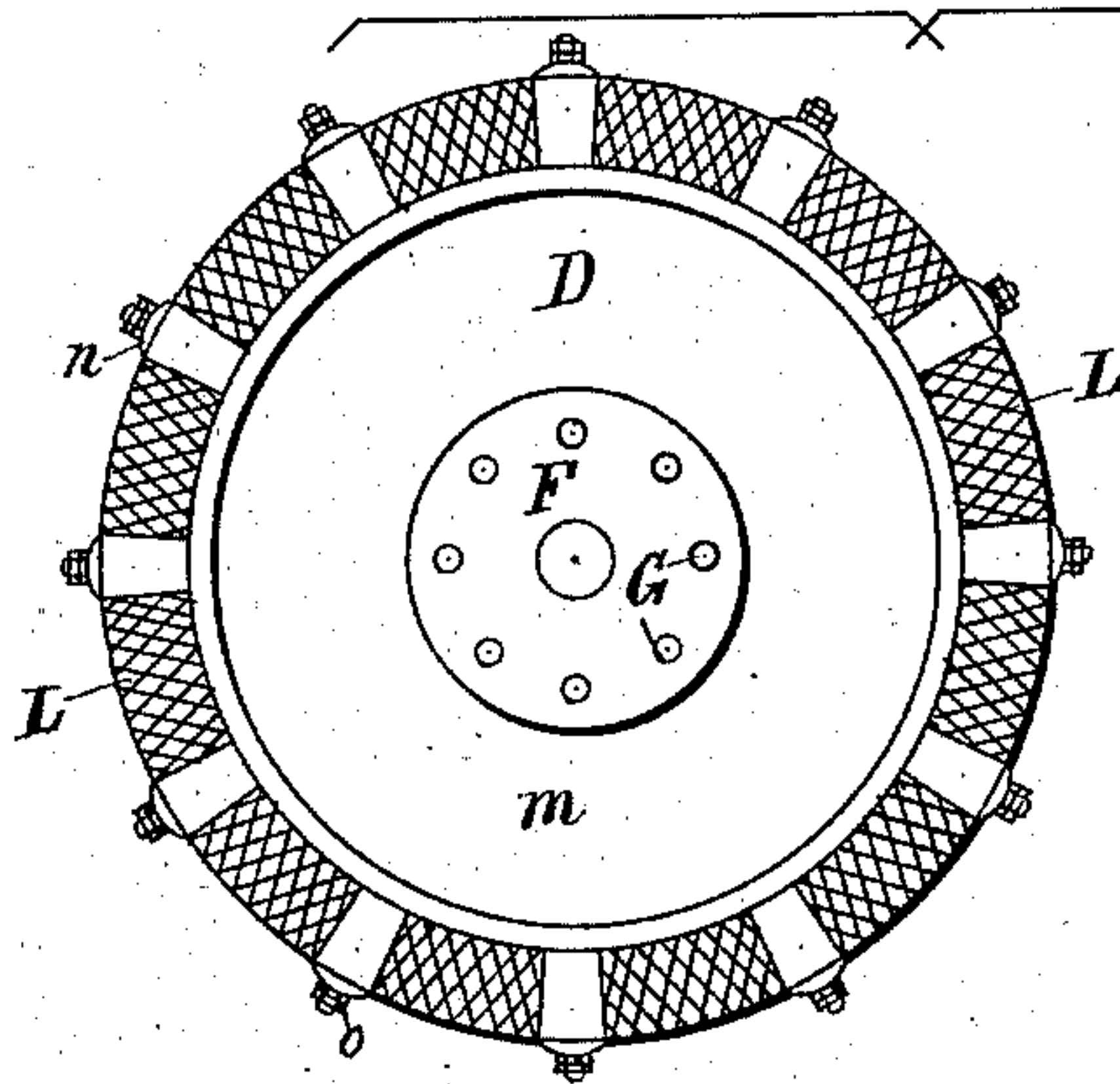
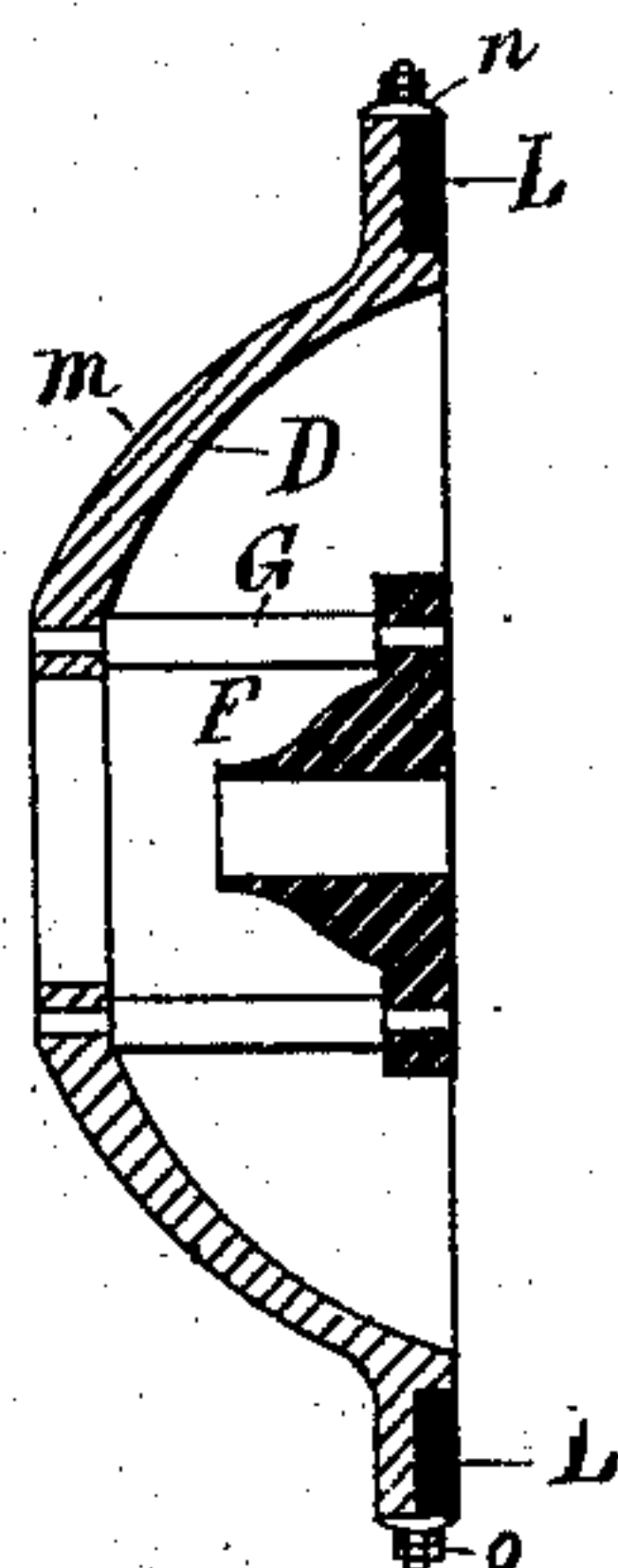
GRINDING AND DECORTICATING MILL.

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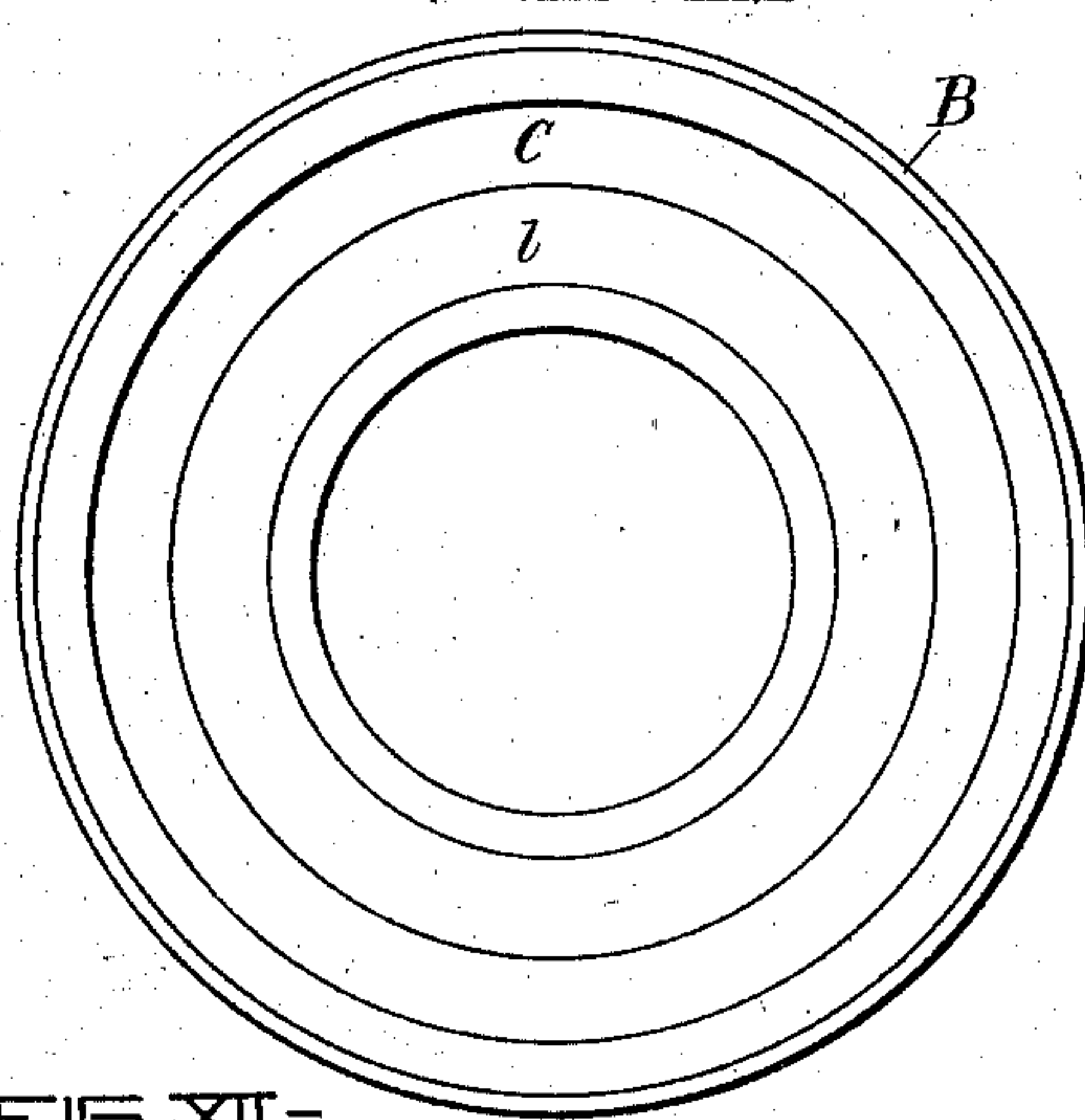
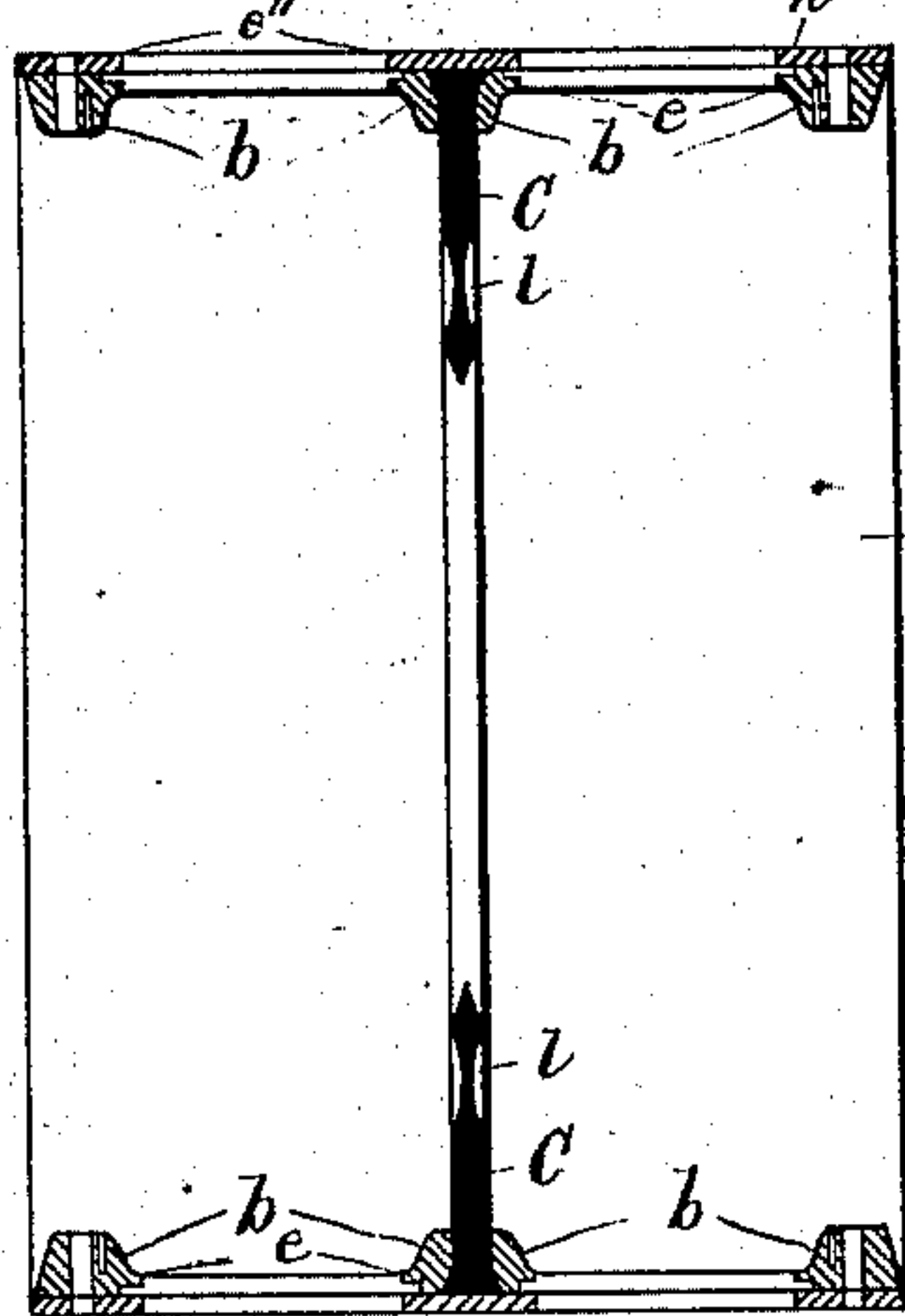
— FIG VI —

— FIG VII —

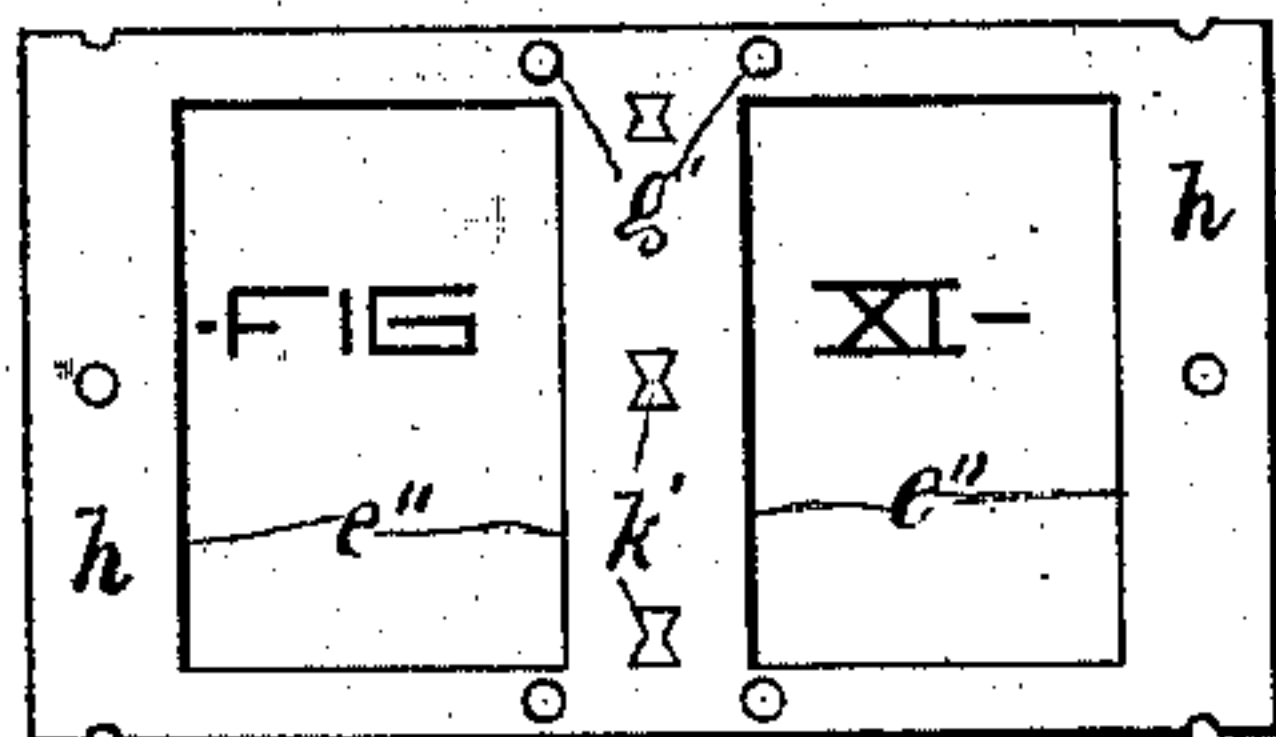
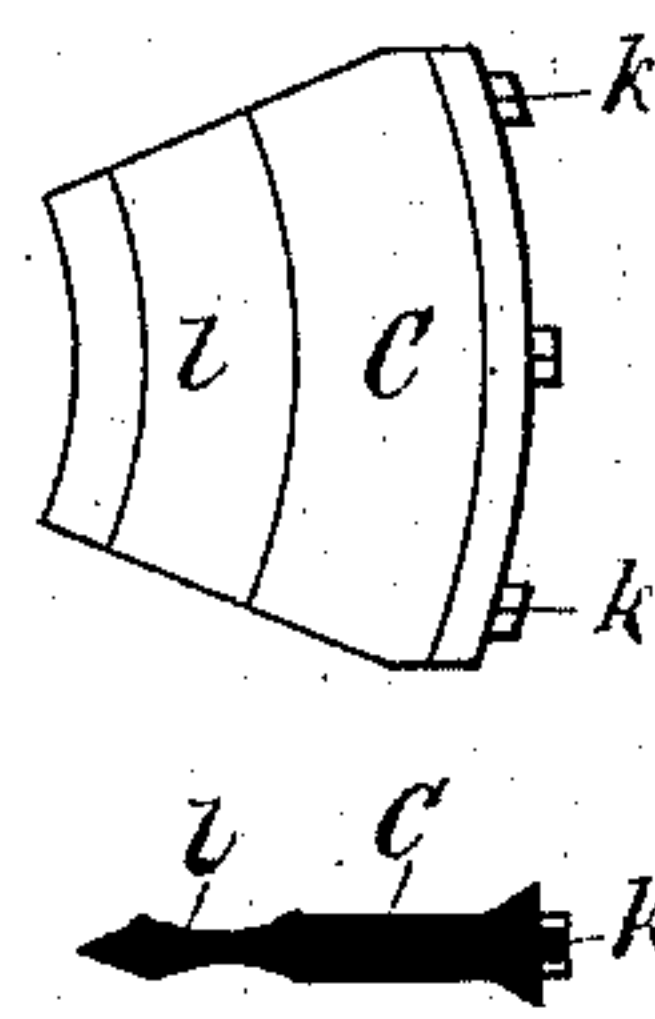


— FIG VIII —

— FIG IX —



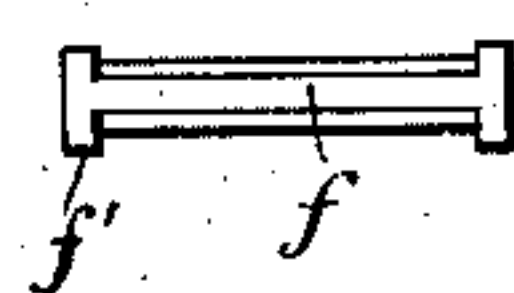
— FIG XI —



— FIG XII —



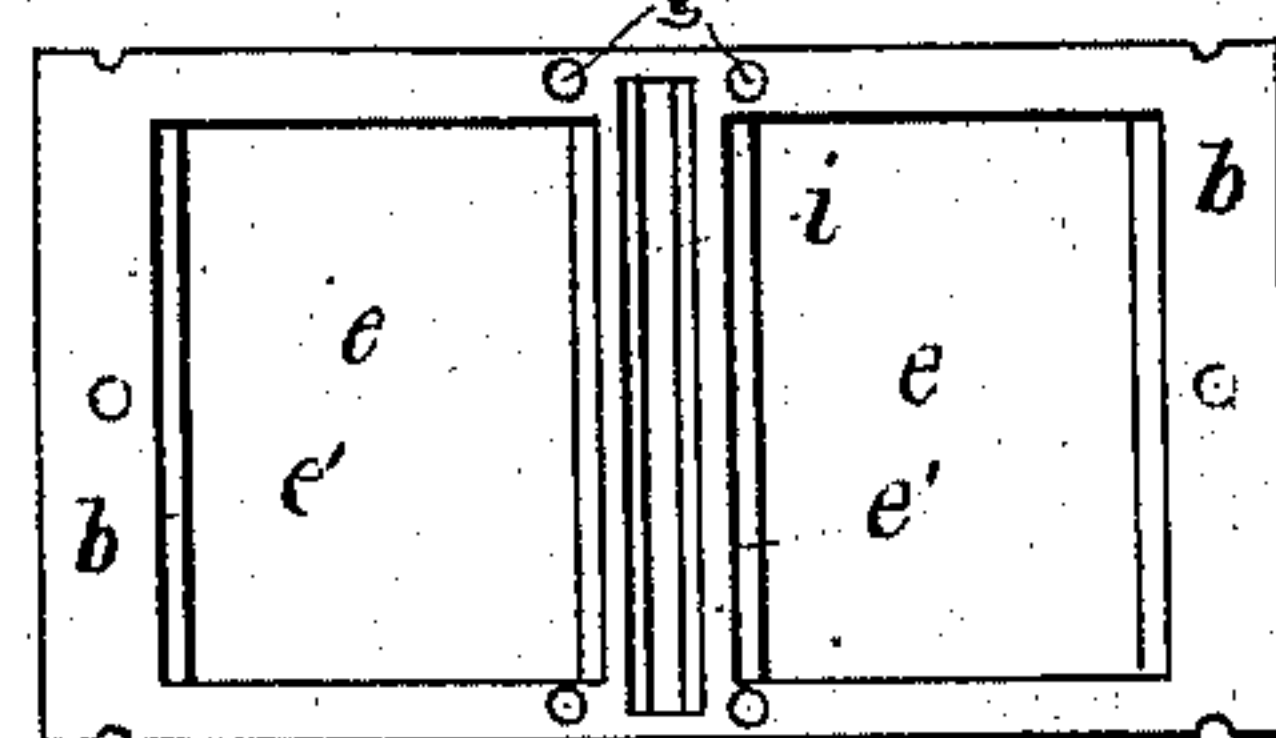
— FIG XIV —



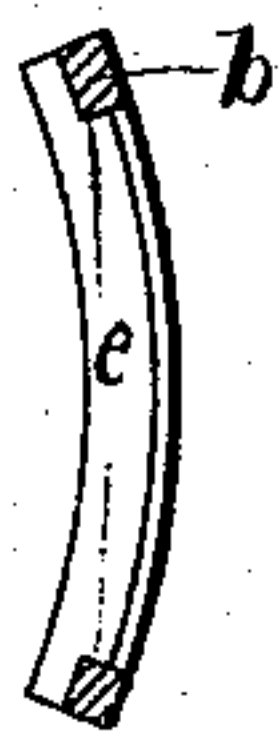
— FIG XV —



— FIG XVI —



— FIG XVII —



— WITNESSES —

— INVENTOR —

Dani Fisher
Charles C. Night

Robert H. Minister,
by G. H. H. Howard,
attor.

UNITED STATES PATENT OFFICE.

ROBERT H. MINISTER, OF BALTIMORE, MARYLAND.

GRINDING AND DECORTICATING MILL.

SPECIFICATION forming part of Letters Patent No. 284,466, dated September 4, 1883.

Application filed May 16, 1883. (No model.)

To all whom it may concern:

Be it known that I, ROBERT H. MINISTER, of the city of Baltimore and State of Maryland, have invented certain Improvements in Grinding and Decorticating Mills, of which the following is a specification.

This invention relates to certain improvements in that class of mills in which the grain is forced out to the grinding devices by centrifugal force, as will hereinafter fully appear.

In the accompanying drawings, forming a part hereof, Figure I is a partly-sectional elevation of the machine. Fig. II is a transverse section taken on the dotted line *xx*, Fig. I. Figs. III to XVI, inclusive, are details of the invention.

Similar letters of reference indicate similar parts in all the views.

A is the outer casing of the machine, cylindrical in shape.

B is a cylindrical cage held stationary within the casing A by means of brackets *a*. The cage B is constructed as follows: A series of segmental plates *b*, are united at their ends to form a cylinder, and the cylinder thus formed is united to central disks *c*, by means of annular sheets of metal *d* and bolts *d'*, the said cylinder and disks having grooves into which the said annular sheets are inserted, as shown in Fig. I of the drawings. The segmental plates *b* (see particularly Figs. XIII and XIV) have openings *e* therein, over which are laid staves *f*. The staves, one of which is shown in Figs. XV and XVI, rest in rabbets *e'*, (see Fig. XIII,) formed in the transverse edges of the plates, next to the openings *e*, and they have projections *f'* at their ends, which serve to keep the body of the staves slightly apart, and thus form slots *g*. (Shown in Fig. II.) The body of the staves is also chamfered to make the slots *g* of a tapered form. The staves are held in place by means of segmental guard-plates *h*, (see Figs. XI and XII,) which have openings *e''* therein, corresponding in size with the ones *e*. These plates are bolted to the segmental plates *b* by the bolts *g'*. (Shown only in Figs. XI and XIII.)

C is an annular polishing-plate formed in sections or segments, the ends of which abut to complete the annular form. Each segment of the said polishing-plate is inserted through a slot, *i*, in the segmental plates *b*, and is held

in place by means of the guard-plates *h*, which cover it. The outer edges or periphery of the sections of the polishing-plate flare outwardly (see Figs. VIII and X) to prevent the insertion of the said segments too far within the cage B, and they have projections *k*, which enter holes *k'* in the plates *h*, prepared for them, to obviate any tendency which the said segments might have to shake or vibrate in the operation of the machine. The groove *l* in the polishing-plate is used for purposes hereinafter described.

D is a revoluble basket formed of two concavo-convex plates, *m*, attached to driving-shafts E by means of the hubs F and the studs G. This mode of connecting the concavo-convex plates *m* to the driving-shafts E allows for the introduction of the grain to be ground, hulled, or polished to the interior of the basket through or by means of spouts H, which are riveted to the outer casing, A, and pass through the annular disks *c*. The driving-shafts are supported, as is also the outer casing, A, by the frame I, and they have driving-pulleys K, which may be revolved in the same direction or in opposite directions.

L L are grinding-plates in segments, held in pockets in the inner surfaces of the concavo-convex plates *m*, in which they are dovetailed by means of caps *n*, which extend over the corners of the said plates, and are drawn in contact therewith by means of bolts *o*, having lock-nuts. They are further held in their pockets by bolts *p*, which are welded to the backs of the said plates or extend through them, in which latter case they have countersunk heads, as shown in Fig. IV of the drawings. The grinding-plates L have roughened inner surfaces, (see Fig. VII,) the roughness being effected by corrugations, or by cutting, after the manner of a file or rasp.

The outer ends of the driving-shaft E, which carry the concavo-convex plates D, bear against blocks *q*, which are backed by spiral springs, as shown in Fig. I, to admit of alteration in width of the spaces between the grinding-plates L and the polishing-plate C. The tension of the springs can be altered by means of screws *r*, which pass through threaded portions of the frame I.

Parts of the invention not yet alluded to will be described and their uses set forth in the de-

scription of the operation of the machine, which
 is as follows: Supposing the machine to be in
 operation, grain to be ground, hulled, or pol-
 ished is introduced through the spouts H to
 5 the interior of the basket D, and, falling upon
 the rapidly-revolving surface of the said bas-
 ket, is thrown outward by centrifugal force.
 The grain in its outward movement naturally
 seeks the portion of the basket of greatest di-
 10 ameter, and thus finds its way to the spaces
 between the polishing-plate and the grinding-
 plates, in passing through which it is either
 broken, brought to a fine state of comminu-
 tion, or merely pearled, according to the width
 15 of the spaces and the character of the surfaces
 against which it comes in contact. The grain,
 after the grinding operation, is thrown against
 the inner surface of the cage B, when the finer
 particles pass through the slots *g* to the space
 20 between the said cage and the casing A and fall
 to the bottom of the said space, which has a fun-
 nel-shaped extension, M, through which they
 escape. The coarser particles of the crushed
 or ground grain remain in the cage and fall to
 25 the bottom thereof, from which they escape
 through the bottom opening, *e*, which is de-
 void of staves *f*, to the central funnel, N. As
 the discharge takes place at all parts of the
 periphery of the basket D and the lower part
 30 of the cage is devoid of staves, the discharge
 from the lower part of the cage is not sepa-
 rated, as is that which impinges against the
 staves. I therefore slot the upper end of the
 funnel N, as shown in Fig. V, and place in the
 35 said funnel two spring gates or doors, O O,
 which retard to some extent the exit of the
 coarse portions of the grain and allow the finer
 to find exit through the slots.

I have shown the polishing-plate C as hav-
 40 ing smooth surfaces; but I do not limit myself
 to this design, as it may have corrugations or
 be roughened, as are the grinding-plates L.

As it is necessary that the grinding-plates L
 should not, under any circumstances, come into
 contact with the polishing-plate C, I provide 45
 the shafts E with collars P, which, together
 with the bearing-boxes Q, prevent such con-
 tact. The object of the groove *l* in the pol-
 ishing-plate C is to facilitate the entrance of
 the grain between the surfaces of the said 50
 plate and the grinding-plates L.

It will be seen that a mill could be construct-
 ed with one concavo-convex plate *m*, the same
 being made to revolve against a polishing-disk,
 which would close the said basket and practi- 55
 cally form a part of the casing; but this would
 reduce the capacity of the mill about one-half.

I claim as my invention—

1. In a mill, a revoluble concavo-convex
 plate having a peripheral grinding-plate, a 60
 fixed surrounding perforate cage, and a fixed
 polishing-plate supported by the said cage, all
 combined substantially as specified.

2. In a mill, the following elements, in com-
 bination, viz: a fixed outer casing, a fixed 65
 perforate cage, an annular polishing-plate sup-
 ported from the said cage, a revoluble basket
 in two sections, grinding-plates adapted to re-
 volve in close proximity to the faces of the said
 polishing-plate, and means to separate the 70
 ground material into two or more bodies, sub-
 stantially as specified.

3. In a mill, a fixed perforate cage, revolu-
 ble shafts which enter the said cage, and are
 provided at their inner ends with concavo- 75
 convex plates and at their outer ends with
 springs, and a fixed polishing-plate supported
 by the said cage, all combined substantially as
 specified.

ROBERT H. MINISTER.

Witnesses:

EDW. J. DIGGS,

WM. T. HOWARD.